NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

AFFILIATION OF NAVAL VETERANS WITH THE SELECTED RESERVE IN THE 21st CENTURY
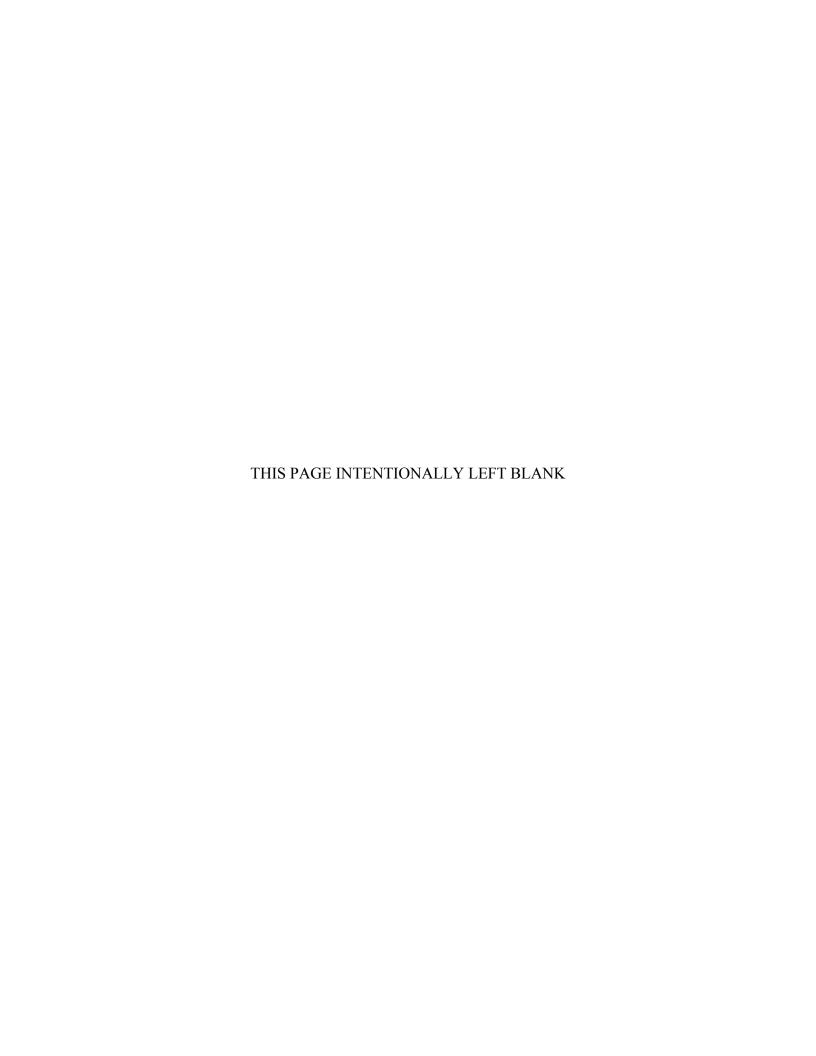
by

Joseph P. Waite

March 2005

Thesis Advisor:	Stephen Mehay
Associate Advisor:	Suzanne Bosque

Approved for public release; distribution is unlimited

THIS PAGE INTENTIONALLY LEFT BLANK

<table>
<tr><td colspan="2">REPORT DOCUMENTATION PAGE</td><td>Form Approved OMB No. 0704-0188</td></tr>
</table>

REPORT DOCUMENTATION PAGE		*Form Approved OMB No. 0704-0188*

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** March 2005	**3. REPORT TYPE AND DATES COVERED** Master's Thesis

4. TITLE AND SUBTITLE: Affiliation of Naval Veterans with the Selected Reserve in the 21st Century	**5. FUNDING NUMBERS**
6. AUTHOR(S) Joseph P, Waite	

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	**8. PERFORMING ORGANIZATION REPORT NUMBER**

9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution unlimited	**12b. DISTRIBUTION CODE**

13. ABSTRACT (maximum 200 words)

This thesis analyzes the factors that influence the decision of first-term Naval Veterans (NAVETs), who are eligible for reenlistment, to choose to affiliate with the Selected Reserve (SELRES). A model of the determinants of affiliation is specified and estimated using data on active Navy separations and Navy Reserve accessions during the period between 1990 and 2002. The data set analyzed the affiliation decisions of 388,637 NAVETs. Some of the features in the maximum likelihood logit model include the use of rating groups to determine differences in affiliation patterns by occupational categories, determining differences over various time periods, and looking at pay and unemployment rate elasticities across rating groups. Overall, NAVET affiliation in the SELRES is found to depend upon Reserve pay, unemployment rates, census region, gender, race, marital status, dependency status, age at time of separation from active duty, education, mental category, and Navy rating. More specifically, the findings indicate that technical ratings are more responsive to changes in pay than non-technical ratings, while the unemployment elasticity indicates that affiliation increases with an increase in the unemployment rate. Various time periods were analyzed to determine if the drawdown years of the early 1990s differed from the rest of the sample, and to determine if differences existed during and after the 'dot.com' boom of the late 1990s. In both cases, models in the restricted period were found to be significantly different from the pooled period. Females, Blacks and Hispanics were more likely to affiliate, while those NAVETs who are married, have children, and are older are less likely to affiliate. Finally, there was a significant regional effect in the probability of affiliation.

14. SUBJECT TERMS Naval Reserve, Affiliation, Reserve Recruiting, Naval Veterans, NAVET, Manpower, Human Capital Strategy.			**15. NUMBER OF PAGES** 69
			16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT Unclassified	**18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified	**19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified	**20. LIMITATION OF ABSTRACT** UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

**AFFILIATION OF NAVAL VETERANS WITH THE SELECTED RESERVE
IN THE 21st CENTURY**

Joseph P. Waite
Commander, United Sates Naval Reserve
B.A., College of the Holy Cross, 1987

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

from the

**NAVAL POSTGRADUATE SCHOOL
March 2005**

Author: Joseph P. Waite

Approved by: Stephen Mehay
                 Thesis Advisor

                 Commander Suzanne Bosque
                 Associate Advisor

                 Douglas A. Brook
                 Dean, Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

ABSTRACT

This thesis analyzes the factors that influence the decision of first-term Naval Veterans (NAVETs), who are eligible for reenlistment, to choose to affiliate with the Selected Reserve (SELRES). Multivariate logit models of the determinants of affiliation are specified and estimated using data on active Navy separations and Navy Reserve accessions during the period between 1990 and 2002. A data set was provided by the Defense Manpower Data Center that permitted analysis of the affiliation decisions of 388,637 NAVETs. Some of the features in the maximum likelihood logit models include the use of rating groups to determine differences in affiliation patterns by occupational categories, determining differences over various time periods, and looking at pay and unemployment rate elasticities across rating groups. Overall, NAVET affiliation in the SELRES is found to depend upon Reserve pay, unemployment rates, Census region, gender, race, marital status, dependents, age at time of separation from active duty, education, mental category, and Navy rating. More specifically, the findings indicate that technical ratings are more responsive to changes in pay than non-technical ratings and that affiliation increases with increases in the local area unemployment rate. Various time periods were analyzed to determine if the drawdown years of the early 1990s differed from the rest of the sample, and to determine if differences existed during and after the 'dot.com' boom of the late 1990s. In both cases, the results indicate that the impact of various determinants differed significantly across these different years. Females, Blacks and Hispanics were more likely to affiliate, while those NAVETs who are married, have children, and are older are less likely to affiliate. Finally, there was a significant regional effect in the probability of affiliation.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

LIST OF TABLES

THIS PAGE INTENTIONALLY LEFT BLANK

I.   INTRODUCTION

Since the tragic events of September 11th, 2001, the nation's reservists have been called into service at rates not seen in two generations. Although the Army Reserve is currently bearing the brunt of the burden in Operation Iraqi Freedom, the Naval Reserve has been used extensively as well, particularly in the medical and force protection fields. These two fields and other specific occupational fields require personnel who are properly trained and qualified in their unique skill set and thus ready for mobilization on short notice. Time is no longer on the side of the reserves, thus mobilizing untrained and unqualified individuals and submitting them to lengthy training programs prior to deployment is no longer a realistic option.

The Title 10 (of the United Sates Code) requirement that a reservist with no prior service must complete what amounts to almost three years of service in a reserve unit prior to their being eligible for mobilization depletes the actual number of reservists available for mobilization. As a result, it is imperative that the Naval Reserve recruit into its ranks Naval Veterans (NAVETs) who bring with them the skills in demand in the Selected Reserves (SELRES). To do this, the recruiters must be aware of what attracts NAVETs to the Selected Reserve. Knowledge of demographics, regional differences, rating differences and pay differences may be attributes that will allow recruiters to focus their efforts and resources on a certain type of NAVET in the hope of strengthening the overall reserve force.

A.   BACKGROUND

In 1986 the Reagan administration was in the midst of finalizing plans for the 600-ship Navy. This planned increase in hardware brought with it the requirement for an increase in manpower that was greater than the active duty Navy could handle. As a result, pressure was exerted on the SELRES to have a sizable, quality force. The best way to both increase the SELRES numbers and ensure it was of high quality was to recruit those individuals separating from active duty.

At this point in time NAVETs constituted the majority of the SELRES force. This pleased the Navy Reserve because it filled their ranks with trained and qualified

sailors, enabling the SELRES to quickly fill any requirements the active force was unable to handle. However, as the SELRES began to take on more unique roles for the active duty Navy it became increasingly important to focus recruiting efforts on those NAVETs that held specific skills. The challenge that confronted the SELRES was the continuous recruitment of these skilled individuals.

As the 1980s closed, the 1990s brought a reduction in the active Navy. Two consequences of the drawdown affected the SELRES. First, as the active force decreased in size, the pool of eligible sailors separating from the Navy decreased as well. With fewer separations came fewer potential NAVET affiliates. Secondly, the SELRES was also decreasing in size and as a result they were more selective as to what skill sets they required and accepted. These two issues resulted in the beginning of a shift away from NAVETs and toward non-prior service (NPS) personnel to fill resulting gaps in the SELRES. As the 1990s closed, the need for NPS sailors continued to increase, but the desire for qualified NAVETs remained.

A further problem that hampered the SELRES' ability to recruit NAVETs was the separation between the active and reserve recruiting commands, and the reserve's limitation on whom they could recruit. A particular problem arose from the fact that reserve recruiters could not recruit NPS personnel under age 26, leaving the 18-26 year old population to the active duty recruiters. Until 2003, two separate recruiting commands existed within the Navy: Commander Navy Recruiting Command (CNRC), and Commander Naval Reserve Recruiting Command. Under this organization, each command worked separately to recruit qualified applicants and each developed separate plans and models on recruitment. Unfortunately, reserve recruitment of NAVETs was based primarily on the separation of active duty sailors, and thus was difficult to predict due to the varied reasons for active duty separation, the geographic location decisions of veterans, and their occupational skills and training.

Under the new naval recruiting organization, reserve recruiting falls under the cognizance of CNRC. As a result, CNRC would like to model reserve recruiting more like active recruiting in an effort to better direct resources to meet recruiting goals and increase affiliation of NAVETs into the SELRES. The need for NAVETs has taken on

increasing importance recently as a significant change has occurred within the make up of the SELRES force over the past five to ten years. During this timeframe the percentage of NAVETs affiliating with the SELRES has continued to decrease and the percentage of NPS personnel has increased. From 2000 to 2003 alone, the percentage of NPS recruits affiliating with the SELRES doubled; from 20 percent of total recruits in 2000 to nearly 42 percent of total recruits in 2003 (Hobson p. 8). Couple the increased dependence on NPS personnel with the downsizing of both the active and reserve force, and the result is a reserve force that will continue to become less experienced and less prepared for deployment.

In an effort to increase the number of NAVETs in the SELRES, the reserve force must first understand the factors that entice first-term NAVETs to affiliate with the SELRES upon completion of their active duty enlistment. In 1987 the Center for Naval Analysis published research by Martha Shiells designed to determine what factors influenced NAVETs to affiliate with the Selected Reserve. Her study was based upon data from 1979 through 1984. Since the publication of Shiells' study numerous things have changed that may affect affiliation rates: the end of the Cold War; the Gulf War of 1990-1991; the terrorist attacks of September 11th, 2001; and the subsequent Global War on Terrorism, including prolonged conflicts in Afghanistan and Iraq. These events have involved the use of reserves in numbers not seen since Korea and Vietnam. More importantly, from a readiness standpoint, because of the increase in NPS personnel the reserves that have been mobilized to meet these demands have less experience then ever before. Since Shiells' study no further research has been conducted to determine if the factors affecting affiliation into the Naval Reserve may have changed.

Finally, the economics of the 21st century differ from those at the end of the 1970s and early 1980s when the United States was coming out of a recession. That being said, is it possible that the reasons for SELRES affiliation have changed over the past two decades? More importantly, the elasticities of pay, bonuses and other factors estimated by Shiells may no longer adequately describe affiliation behavior. If this is the case then CNRC could benefit from a new analysis of reserve recruiting, especially the recruitment of NAVETs. Also, manpower planners can use the new pay, bonus, recruiter and other elasticities to help choose among alternative recruitment polices.

3

B.   OBJECTIVES

This thesis intends to examine the factors that affect affiliation rates of first-term NAVETs in the Selected Reserve. First-term veterans (individuals who successfully completed their first term of enlistment in the active Navy and are eligible for reenlistment upon separation) who separated from the Navy during the period 1990 to 2002 will be analyzed to determine those who affiliated with the SELRES within one year of their active duty separation date. The individuals who affiliated with the SELRES will be analyzed to determine if there are any trends that may indicate a preference for the Selected Reserve. A review will be conducted of literature on the theory of the decision to work, especially the decision to work a second job, and the implications for Selected Reserve affiliation.

The prediction model will include factors such as gender, age, ethnicity, rating, wages/pay, marital status, education levels and region. This thesis intends to use a maximum likelihood logit model to predict the probability of affiliation, conditional on the selected independent variables. It is hoped that the model will be able to help predict affiliation rates for individuals in the SELRES, but more importantly will be able to determine the factors most influential in determining NAVET affiliation with the Selected Reserve. The estimated elasticities from this work will be compared to those estimated by Shiells' to determine whether behavior has changed in the last 20 years.

This thesis intends two answer to questions. The primary question is whether pay and other important factors have the same effects (elasticities) on reserve affiliation as in the early 1980s. The secondary question addresses the hypothesis that Selected Reserve affiliation decisions differ significantly across regions and ratings.

C.   ORGANIZATION OF THE THESIS

This thesis contains five chapters. Chapter I provides an introduction and general background information on the area of analysis. Chapter II conducts a literature review relating to Selected Reserve affiliation and the economic theory of the decision to work a second job. Chapter III describes model specification and methodology as well as the data used in the study. Chapter IV contains the results of the analysis based upon the models developed. Chapter V provides conclusions and recommendations based upon the findings of the study.

II.   LITERATURE REVIEW

A.   STUDY BY MARTHA SHIELLS, (1986)

1.   History

In 1986 the Reagan administration was in the midst of finalizing plans for the 600-ship Navy. This planned increase in hardware brought with it the requirement for an increase in manpower, and this increase was greater than the active duty Navy could handle on it's own. As a result, pressure was exerted on the Naval Reserve to have a sizable, quality force. The best way to both increase the Naval Reserve and ensure it was of high quality was to recruit individuals coming off of active duty.   The Research Memorandum written by Martha E. Shiells in December 1986 for the Center for Naval Analyses entitled *Affiliation of Navy Veterans with the Selected Reserve* looked at this issue to determine what factors influenced the decision of first time enlisted Navy veterans to join the SELRES. She focused on the effect of affiliation bonuses.

When this research was conducted NAVETs constituted the bulk of the Naval Reserve force. This was a positive attribute from the Naval Reserve's point of view because they tended to get more qualified personnel; however, as the reserve force began to take on more unique roles for the active duty Navy, it became increasingly important to focus recruiting efforts on those NAVETs that held specific skills. In order to determine the best way to recruit these individuals Shiells concentrated on NAVETs pay/compensation, rating, paygrade, age, race and sex. In addition, to help capture some of the potential effects of the current economic environment she included the geographic home of record of the NAVET and the unemployment rate in the state where the geographic home was located.

Her model was developed to better predict what type of NAVET is most likely to affiliate with the SELRES, and from this the reserves could better target recruiting efforts, to include affiliation bonuses, that would bring in the NAVETs who met the new requirements of the active Navy.

2.   Theory

The theory of the decision to work states that individuals make labor supply decisions that maximize their utility level, and that this decision is based upon three things; the opportunity cost of leisure, the individual's level of wealth, and the individual's preferences (Ehrenberg and Smith, 2003). When a NAVET leaves the Navy and joins the workforce, they are substituting their Navy base pay for the base pay received at the job they acquire in the civilian sector. Assuming that they desire the same level of leisure during this transition, we can also assume that the civilian income must match that of the Navy. We can further assume that there is no increase in wealth associated with this move to the civilian sector. If the civilian job does not meet the individual's utility level, they will need to increase their income through increased work. There are two means available to the NAVETs in this study to increase their income: first, they can work a part-time job above and beyond their regular job; or, second, they could join the SELRES. In this case the SELRES is a part-time job, which would substitute for a civilian part-time job.

During Shiells' study, these two alternatives were taken into account when determining whether a NAVET would join the SELRES. In addition, because the economic climate is believed to effect an individual's decision, the unemployment level of the state the NAVET lists as their home of record was used as a prediction of affiliation. Finally, because an increase in an individual's income level shifts their budget constraint outward the study looks at the impact an affiliation bonus would have on recruiting NAVETs. From theory it would be expected that the bonus would cause an income effect, shifting the NAVETs budget constraint and thus their utility curve to the northeast and result in decreased work hours. However, a substitution effect would exist as well such that the same level of work, regular job plus the part-time SELRES job, would increase the individual's overall income and make them better off. It is this concept that the study looks at, for if this is the true effect, then an affiliation bonus would be a positive factor in recruiting NAVETs in the SELRES.

Using the theory of the decision to work, the underlying premise in the model is that a first term Navy enlistee who has not maximized their utility level upon entering the civilian work force will seek to increase their utility level. To do so the individual could

take on a part-time job, increase their leisure time, or affiliate with the SELRES. A decision to affiliate with the SELRES indicates that this use of their time offers the highest utility to the individual. Thus the probability of affiliating with the SELRES could be determined by looking at the following factors:

- The difference in wages made as a SELRES vice the wages that could be made at a civilian part-time job (all reserve wages are included here to include affiliation bonuses).

- A matrix of personal characteristics (to include sex, race, age, marital status, education, geographic area, and ability, where ability is measured using Armed Forces Qualification Test (AFQT) scores, whether the individual is a high school graduate, and their active duty paygrade).

- The characteristics of a full-time job (measured in terms of the unemployment level in the state the NAVET claims as his home of record, and using the NAVETs Navy rating as a proxy for their earnings and employment potential.

- The characteristics of a reserve job.

- The characteristics of a part-time job.

An issue of import with this model is that demand is not constant, and therefore affiliation may not be an accurate measure of the available NAVETs. When this study was conducted it used the Reserve Recruiting and Manning Objectives System (RAMOS) to determine what ratings were overmanned. RAMOS ratings D and E refer to ratings that are manned above 100%, and these ratings were omitted from the study in an effort to minimize the effect of demand constraints on the affiliation model.

3. Shiells' Estimation method

The model Shiells developed to estimate the probability of a NAVET affiliating with the Naval Reserve is the following logit model:

$$\ln[(P_A / (1-P_A)] = \beta_0 + \beta_1 \, WRES + \beta_2 \, URATE + \beta_3 \, PG + \beta_4 \, EDUC +$$

$$\beta_5 \, MG + \beta_6 \, SEX + \beta_7 \, RACE + \beta_8 \, MARRIED + \beta_9 \, AGE +$$

$$\beta_{10} \, REGIONS + \beta_{11} \, RATINGS + u,$$

where the left hand side of the equation is the log of the odds that a NAVET will join the reserves, *WRES* is all forms of compensation given to reservists, *URATE* is the unemployment rate, *PG* is a matrix of dummy variables indicating the paygrade of the NAVET upon leaving active duty, *EDUC* is whether individual was a high school grad,

MG is mental group, *SEX, RACE, MARRIED, AGE* are self explanatory, *REGIONS* is what geographic census region the individual had as their home of record, and *RATINGS* is based upon the dummy variables taken from Shiells' study. The estimation was done separately for each of the 11 rating groups. The logit model was estimated using maximum likelihood techniques.

4.   Data

The data sample consisted of NAVETs who separated after their first term enlistment and near the end of their obligated service. The data set was constructed by finding active Navy losses from April 1979 to September 1984 on the Enlisted Master Records (EMRs) and matching them with SELRES affiliation in the Reserve Component Common Personnel Data System (RCCPDS). This sample identified 591,999 losses of which 444,264 were excluded for various reasons. Of the remaining 147,735 records, 2,174 were excluded due to missing data. Finally, as a result of the demand constraint referred to earlier, 49,752 losses were excluded because the individuals were in closed ratings, and thus unable to affiliate with the SELRES. This left the final number of records used in the model as 95,809.

5.   Shiells' Results

The fit of the estimated model was good, with all 11 rating categories significant at the 1-percent level. As Table 1 indicates, in six of the 11 rating groups, pay was both significant and positive.

Table 1.   Pay and Unemployment Rate Elasticities in Shiells (1986)

Rating Group	Pay	Unemployment Rate
Seamanship	1.47**	0.35**
Elect Equip Repair	1.01**	0.37**
Comms / Intel	0.98**	0.34**
Medical	1.29**	0.51**
Other Technical	0.70	0.33
Admin / Clerical	1.95**	0.63**
Mech Equip Rep -Av	-0.56	0.31**
Mech Equip Rep-Surf	0.44	0.63**
Craftsman	0.77*	0.63**
Service / Supply	0.16	0.54**
Unrated	0.25	0.90**

Note: Two asterisks indicate significance at the
1-percent confidence level, and one asterisk,
at the 5-percent level.

In addition, higher unemployment rates significantly increase affiliation rates in 10 of the 11 rating groups.

The study focused primarily upon the effects on affiliation rates of a change in pay. Shiells concludes that overall pay does have a significant impact on affiliation of NAVETs in the Navy Reserve. This is based on two key results: the first looked at the percentage change in affiliation rates caused by a 1-percent change in real reserve wages, that is the pay elasticity. The second looked at the estimated affiliation rates with and without an affiliation bonus program. The first shows that NAVETs entering the reserves respond to pay, and that the higher the unemployment rate the higher the affiliation rate. The second indicates that for those rating groups where an affiliation bonus is available, the existence of the bonus had a positive impact on the affiliation rate.

Shiells concludes that there are no differences in pay elasticity between regions; however, the study shows that there is an increased probability of a NAVET affiliating with the SELRES in certain regions. Two of the strongest affiliation predictors found in the Shiells study were that of females and non-whites. Female affiliation rates were higher than males in nine of the 11 rating groups, and non-whites affiliation rates were greater than whites in 10 of the 11 rating groups. Age and marital status had almost no significance, while paygrade indicated that "fast tracked" sailors, those who enlisted under special programs allowing them to enter at a higher paygrade, were more apt to affiliate than junior personnel. Overall, the study provides evidence that affiliation rates among NAVETs are predicted by certain characteristics, and these characteristics seem reasonable in all instances.

B. AFFECTS OF OPERATION DESERT SHIELD/STORM (ODS/S)

Reserve mobilization was relatively unknown prior to ODS/S and thus the effects of mobilization on reserve affiliation and retention required study. Sheila Kirby and Scott Naftel (1997, 1998) have led the charge researching the effects of reserve participation in ODS/S, and their findings may have some relevance to this study and future studies that use data taken shortly after September 11, 2001.

1.   **Costs and Benefits of Reserve Participation: New Evidence from the 1992 Reserve Components Surveys (RCS) (Kirby, Grissman, Williamson, Naftel, 1997)**

Prior to ODS/S SELRES were unlikely to factor mobilization into their decision to affiliate. This was the first of two studies to determine if mobilization had any effects on the decision of SELRES to reenlist. These studies are being reviewed because there may be some relevant lessons that can be learned by analyzing the decision by an existing SELRES member to reenlist in an environment that includes potential mobilization, and a NAVET's decision to affiliate with the SELRES in the same environment. In this study, the authors compared the responses from the 1986 and 1992 Reserve Components Survey (RCS) to find differences that might be attributable to mobilization, as well as compared responses from mobilized SELRES and non-mobilized SELRES who responded to the 1992 RCS.

The comparisons used in this study (Kirby et al., 1997) showed no dramatic change in overall behavior that could be attributable to ODS/S, and that little or no difference could be found in the overall retention rate of mobilized versus non-mobilized SELRES (Kirby et. al., 1997, p.xxi). A few interesting results emerged when looking at the study's findings from a moonlighting versus SELRES job perspective. The first is that potential income loss was determined to be the most important concern of SELRES when mobilized. It is possible that for NAVET affiliates, this concern could sway them toward a civilian moonlighting job vice the SELRES if they believe their personal utility level would decrease as a result of joining the SELRES. The second biggest concern regarding mobilization was found to be an unfair burden upon the spouse of a mobilized SELRES. Again, this could sway a NAVET trying to maximize their personal utility.

An important aspect of this study is that the mobilization that occurred during ODS/S was a popular one. It was of a short duration, was very patriotic, put few individuals in imminent danger, and thus may have had a positive impact on post ODS/S retention. The authors are quick to note that any findings in the comparisons they found were based upon ODS/S, and thus generalizations regarding other mobilizations would be dangerous. This is an important warning as the post 9/11 mobilization began on a positive patriotic note, but as time has passed and SELRES mobilizations have become

lengthy the impact on future retention and NAVET affiliation is unknown. We do know anecdotally that some active duty members have decided that it is better to either stay active or not affiliate with the SELRES. They believe that because their skills and training are current they will be at the top of the mobilization list if they affiliate with the SELRES.

2.   **The Effect of Mobilization on Retention of Enlisted Reservists After ODS/S (Kirby and Naftel, 1998)**

After finishing the initial comparison described above Kirby and Naftel conducted a statistical study asking how the mobilization affected SELRES. Again this is being included in the literature review as a possible means of comparison to NAVET's decision to affiliate with the SELRES and because it used traditional moonlighting labor market theory as its basis. The findings indicate that household monetary and non-monetary decisions, taking mobilization into consideration, affect the probability of retention among SELRES.

The authors found four aspects of the reserves that set it apart from civilian sector part-time jobs: 1) the SELRES requires a substantial training investment; 2) potential longevity and job security exist with the SELRES; 3) retirement benefits; and 4) non-pecuniary benefits not available in the civilian sector (Kirby and Naftel, 1998, p. 8).

The study found that mobilization during ODS/S had little effect on the probability of SELRES retention. Interestingly, the likelihood of being mobilized, as viewed by the SELRES himself, had a small positive effect on retention, suggesting that mobilization may be appreciated by SELRES members as means to show their worth and practice their skills (Kirby and Naftel, 1998, p. xiv). As in the first study, spousal and family approval increased retention while a negative attitude decreased retention. Of interest to the discussion concerning personal utility, it was found that mobilized SELRES members who experienced the greatest economic losses due to mobilization had lower retention rates.

C. RESERVE PARTICIPATION VERSUS MOONLIGHTING: ARE THEY THE SAME? (MEHAY, 1990)

1. Labor Supply Theory

This study was conducted to determine if statistical differences exist between individuals who choose reserve participation over moonlighting in a civilian job. The crux of the issue is whether reserve participation is simply a form of moonlighting, working a second job to increase income and thus increase personal utility, or whether it fits into a separate category because non-monetary aspects are taken into account by an individual when they choose to join the SELRES vice take a moonlighting job in the civilian sector.

The study's hypothesis is that an individual has three alternatives to yield maximum personal utility: they can work one full-time job only, they can work a primary full-time job plus a moonlighting job, or they can work a primary full-time job plus participate in the SELRES (Mehay, p.327). A number of factors were taken into account while determining the differences between the three options including; the hourly wage rate, work hours, other family income, military-to-civilian pay ratio, local economic conditions (unemployment), local population growth rate, and median rent. These factors were all analyzed using data from 44 standard metropolitan statistical areas.

2. Results

Results from the study indicate that the decision to affiliate with the reserves is not equivalent to the decision to moonlight, and in fact the effect of the moonlighting labor supply variables on labor force choices differed significantly between the reserve and moonlighting options (Mehay, p. 336). The following are some of the findings that led to this conclusion. First, reservists, contrary to moonlighters, do not find underemployment on their primary job as an important reason to hold a second job. Secondly, the local economy acts differently on the two alternatives. A poor economy decreases moonlighting opportunities and makes the reserves more attractive, while a good economy increases moonlighting opportunities and thus decreases the relative attractiveness of the reserves. Third, an increase in family size increases the probability of reserve affiliation but decreases the chances of moonlighting. Finally, geography plays in important role. This could be partly due to the attitudes toward the military in

12

various geographic regions or the availability of meaningful reserve duty based upon proximity to the active fleet.

D.   FACTORS / DETERMINANTS

Throughout the literature on reserve affiliation, a common theme is the need to account for demand constraints that affect affiliation opportunities. Some of these are obvious, such as the number of NAVETs, while others such as regional differences, are not quite so straightforward. The following are factors that must be taken into account when analyzing at reserve affiliation.

1.   Supply Constraints

a. Geographic Specificity

The reserve force is unique in that most SELRES are recruited, and subsequently drill, within 100 miles of their home (Asch, 1986 p.1). Further, although the reserve force is represented in all 50 states, there are pockets of reserve influence surrounding the active Navy's main regional areas, mainly the east coast, west coast, and gulf regions.

b. Unemployment Rate

In conjunction with geographic specificity the possibility that economic variables differ by region could affect affiliation as well. To account for this effect there is a need to take regional unemployment rates into account. Past studies have used a pay elasticity to help account for this effect on supply. Estimates of SELRES pay elasticities vary by study.   When based upon national unemployment rates without taking occupational skills into account SELRES have been shown to have pay elasticities ranging from 1.44 to 1.56 (Asch, 1986, p.6). When SELRES ratings are factored into the analyses pay elasticities range from -.56 to 1.95 (Shiells, 1986, p26). Of course, because these studies were conducted using data from the late 1970s and early 1980s, the unemployment rates were relatively high, estimated in the area of 10 percent.

c. Military to Civilian Pay Ratio

Active recruiters and retention experts often use the military-to-civilian pay ratio to show how military pay compares to civilian sector pay. By extension this determines whether the military enables an individual to meet their utility level, or whether their utility level is best met in the civilian sector. This translates to the reserves

because if the economy is such that an individual's civilian job pays substantially more than their military job did, they may be less apt to join the SELRES. On the other hand, if the economy is weak with a high unemployment rate, and consequentially a higher military to civilian pay ratio, a NAVET may be driven to affiliate with the SELRES to maintain their utility level at or near the level it was while in the active Navy.

2. Demand Constraints

a. Restricted Entry into Certain Ratings

Due to the constant change in reserve requirements, at various times some ratings in the SELRES may be closed to NAVETs. Thus the lack of demand for certain skills may constrain the number of accessions (Shiells, 1986, p.11). Shiells used the Reserve Recruiting and Manning Objectives System (RAMOS) to determine what ratings were closed, and eliminated these individuals form here data. Since 1986 the Navy has replaced RAMOS with Enlisted Classification and Manning Objective (ECMO) categories to determine overmanned ratings.

b. Recruiter Goals

Recruiters change their recruitment goals and strategies to meet the needs of the SELRES. During the timeframe used in this study, the number of SELRES required has dramatically decreased as both the active and reserve Navy have reorganized and right-sized. As a result, the goals recruiters had in the early 1990s are far different from those today. On the one hand the decreased goals enable recruiters to be more selective, while on the other hand, the decreased size of the active Navy results in a smaller pool of NAVETs available for reserve recruiters to track.

c. Non-Availability of Reserve Billets

From 1990 to present the percentage of SELRES to active duty Navy has dropped slightly from 26 percent to 23 percent. This small percentage drop combined with an overall decrease in numbers in both components could potentially lead to a situation where there is greater demand for reserve billets then exist. Although this is unlikely to affect NAVETs because they are the preferred reserve recruit over a non-prior-service individual, the possibility exists that a NAVETs skill set does not exist within the SELRES (Grissmer, Kirby, Buddin, Kawata, Sollinger, Williamson, 1994, p.10)

III.   METHODS OF ANALYSIS

A.   DATA

The data in this analysis was constructed using all active duty first term Navy enlisted losses from the Enlisted Master Records (EMR) from Fiscal Years 1990 to 2002 and matching them by social security number (SSN) to SELRES affiliations in the Reserve Component Common Personnel Data System (RCCPDS) from Fiscal Years 1990 to 2003. All data files were provided by` the Defense Manpower Data Center (DMDC). Reserve affiliation data from Fiscal Years 1990 to 1994 was derived using EMR decade Composite Loss Files, while all subsequent years affiliation data was derived using annual transaction roll-up files[1]. The final data file included only NAVETs who separated after their first term enlistment, were eligible for the SELRES, and were either in the United States or one of its territories. Excluding NAVETs who failed to meet these criteria, a total of 388,667 valid losses remained. Table 2 shows the distribution of losses by fiscal year. Notice that a large percentage of these losses occurred during the drawdown in the early 1990s.

The annual roll-up data file contained numerous cases of multiple transactions for each unique SSN (i.e., each person). Using transaction type as a basis, the duplicates were eliminated using the following logic:

a. Transaction types that indicated 1) an individual was a reenlistment gain with a break-in-service of less than 91 days (not a new SELRES affiliate), 2) was considered a non-prior service affiliate, or 3) was gained from another reserve service component were deleted because they did not meet the requirements of a NAVET affiliating directly into the SELRES.

b. If the transaction date most closely related to the individual's separation from active duty date indicated they had prior active service but were affiliating from the civilian sector, went directly from active duty into the reserves, were considered an "other" gain, affiliated directly from the active reserve force (AGR) to the SELRES, or

---

1 EMR decade Composite Loss files are the oldest reserve data files DMDC possesses. They are an accumulation of data obtained over the course of the decade. The annual transaction files are annual files DMDC began keeping in 1995. These files are more robust and provide more detailed information than the decade Composite Loss file of the 1990s.

from the Individual Ready Reserve (IRR) to the SELRES then this transaction date was maintained, and all other transaction dates were deleted.

Table 2.   Active Duty Losses by Fiscal Year

Fiscal Year	Number of NAVETs	Percent of Losses
1990	40,951	10.5
1991	39,365	10.1
1992	43,467	11.2
1993	42,070	10.8
1994	36,304	9.3
1995	26,857	6.9
1996	22,565	5.8
1997	29,217	7.5
1998	18,966	4.9
1999	19,801	5.1
2000	21,252	5.5
2001	25,106	6.5
2002	22,716	5.9
	388,637	100

Source: Author

c. If the most recent transaction date indicated the individual went from the SELRES to the AGR, this date was deleted and the above logic was run on the next most recent transaction date.

d. If the transaction type listed in the data field was anything other than those described above, the transaction for the individual was deleted.

The use of this logic resulted in a single transaction data line for each unique SSN in the data file.

The DMDC EMR data file was merged with the annual transaction roll-up files to produce a single file of all personnel losses from Fiscal Years 1990 to 2002. If an SSN existed in both data files, the data from the annual roll-up files was used. The end result was a single data file with one transaction date and type for each unique SSN (individual) who affiliated with the SELRES from 1990 to 2002. The active duty separation date was

16

subtracted from the reserve transaction date to determine the length of time between separation and reserve affiliation for each observation.

Unemployment data was merged into the data file using state unemployment rate statistics obtained from the Bureau of Labor Statistics for the years 1989 to 2003. The individual's active duty separation date was used to determine what unemployment year to assign to them, and the individual's unemployment state was either their active duty home of record, for non-reserve affiliates, or their reserve duty state, for reserve affiliates.

Reserve affiliation bonus information was not used in the model. The data set described above indicated that only 217 of the 388,637 observations received an affiliation bonus. This was not believed to be an accurate reflection of reality as the data set indicated over 70,000 affiliates had an 'unknown' bonus. Because of missing information, affiliation bonus could not be used as an explanatory variable in the model.

An attempt was made to create rating group categories. The rating groups were formulated based on those used by Shiells (1986), with some differences. Table 3 describes how the 111 ratings, found in the data set, were assigned to 10 rating groups.

Table 3.   Classification of Ratings into Occupational Categories

1 Seamanship	BM, GM, GMG, GMM, QM
2 Electronic Equipment Repair	AQ, AX, CTM, DS, ET, FC FT, FTB, FTG, MT, ST, STG, STS, TM
3 Communications / Intelligence	AC, AW, CTI, CTO, CTR, CTT, EW, IC, IS, IT, OS, OT, OTA, OTM, RM, SM
4 Medical	DA, DR, DN, DT, HA, HR, HN, HM
5 Administrative / Clerical	AK, AZ, CTA, DK, DP, JO, LN, MA, NC, PC, PN, RP, SK, YN
6 Mechanical Equipment Repair - Aviation	AB, ABE, ABF, ABH, AD, AE, AM, AME, AMH, AMS, AO, AS, ASE, ASM, AT
7 Mechanical Equipment Repair - Surface	BT, CM, DC, EM, EN, GS, GSE, GSM, IM, MM, MN, OM, WT
8 Craftsman and other Technical	BU, CE, EO, HT, LI, ML, MR, PM, SW, UT, AG, DM, EA, MU, PH
9 Service / Supply	MS, PR, SH
10 Non-rates	AA, AR, AN, CA, CR, CN, FA, FR, FN, SA, SR, SN

Source: Author

Finally, after accounting for lost observations due to missing variables, a total of 388,637 observations were used in the analysis. Of these 388,637 NAVETs, 43,611 affiliated with the SELRES.

B. CLOSED RATINGS

Past research in this area has taken into account the fact that not all NAVETs are eligible for affiliation with the SELRES. Shiells' (1986) accounted for the demand constraint associated with closed ratings in the SELRES by omitting observations from her data set that were in closed ratings, defined as those ratings which were manned above 100 percent and for which SELRES affiliation was not authorized. The Navy has changed the mechanism with which these ratings are determined since Shiells' study (1986), and now determines these closed ratings using Enlisted Career Management Objectives (ECMO) categories. Despite the name change, the concept remains the same and it would seem that individuals in closed ECMO categories should be excluded from the data set.

However, over the past decade the number of non-prior service (NPS) personnel in the Naval Reserve has crept upward putting a strain on the force. As VADM Cotton Commander of the Naval Reserve Forces stated while discussing the need for NAVETs:

> The Zero Based Review is an opportunity. It's already started and it's going to continue for the foreseeable future. A reservist of the future, we want them to be NAVETs. We want people who have served, who have gone to bootcamp. Maybe they came out and did something in civilian life, but they still have those skill sets. We want to give them the onramp to come back in and complete their Navy careers, overall it's a wonderful opportunity. (VADM Cotton, Navy News Update, 21 Sep 2004)

In an attempt to minimize NPS personnel and maximize the number of NAVETs in the SELRES, Commander Naval Reserve Forces Command (CNRFC) has made continuous changes to their Drilling Reserve Enlisted Recruiting Goals and Policies letters over the past few years. Unfortunately, much of this flexibility is not quantifiable. As the need to affiliate NAVETs has increased it is plausible that the number of waivers that have been allowed in closed ratings has also increased. In addition, the policy changes have also affected the use of the RESCORE-R program (CNRFC letters). This program, the normal method of affiliating an individual in a closed ECMO category,

allows for individuals in identified closed ratings to affiliate with the SELRES by accessing into open ratings via a change of rating. Requirements for the program include the following:

    a. Individual must be in paygrades E4 through E6.
    b. They must be within 60 months of active duty separation.
    c. They must agree to convert from an ECMO category "C" (closed) rating to an ECMO category "A" (open) rating.
    d. They must obligate to the reserves for four years.
    e. Must complete lateral conversion requirements within ten months of affiliation.
    f. Must participate in the first advancement exam they are eligible for.
    g. Rating conversion NEC must be requested upon enlistment.
       (CNRFINST 1001.5 series).

The tracking of individuals who affiliated in the SELRES via the RESCORE-R program or whom received waivers would be difficult, but they are likely to constitute a significant number of affiliates over the years covered in the sample in this analysis. Not being able to identify observations based upon Reserve Recruiting and Manning Objectives System (RAMOS) or ECMO categories could therefore lead to inaccuracies in identifying eligible NAVETs as well as the number of NAVET affiliates. However, due to the difficulty of identifying people in these categories, RAMOS and ECMO category ineligible personnel were not excluded from this data set.

C.   DEPENDENT VARIABLE - AFFILIATION IN THE NAVAL SELECTED RESERVE

The dependent variable used in this study represents affiliation decisions in the Naval Selected Reserve. Affiliation is measured by a binary variable based on the time between individuals' separation from the active duty Navy and their affiliation with the SELRES. To determine the elapsed time between separation and affiliation, the separation date was subtracted from the affiliation date. If the difference between the dates was less than or equal to one year the individual was considered an affiliate; those who affiliated outside of one year or who never affiliated were considered non-affiliates. In the estimated logit model, the dependent variable is the log of the odds that a NAVET will join the SELRES; 43,611 NAVETs, or 11.2 percent of all eligible NAVETs found in this sample affiliated with the SELRES within one year of separation from active duty. Table 4 depicts affiliation by rating group. Overall, the technical rating groups (electronic equipment repair and mechanical equipment repair) have the lowest affiliation

rates while the non-technical rating groups (e.g., 'non-rates' and 'seamanship') have some of the highest affiliation rates.

Table 4.   SELRES Affiliation Rates by Rating Group

Rating Group	# of Affiliates	# NAVETS	Affiliation Rate
SEAMANSHIP	4,004	24,625	16.3
ELECTRONIC REPAIR	1,363	31,299	4.4
COMMS / INTEL	5,678	57,559	9.9
MEDICAL	3,315	25,084	13.2
ADMIN / CLERICAL	4,470	37,627	11.9
MECH REP - AVIATION	7,375	66,921	11.0
MECH REP - SURF	5,424	66,380	8.2
CRAFTSMAN / TECH	2,090	20,408	10.2
SERVICE / SUPPLY	2,315	20,165	11.5
NON-RATES	7,577	38,569	19.6
All Ratings	43,611	388,637	11.2

Source: Author

D.   EXPLANATORY VARIABLES

In this section, the definitions of the independent variables used in the logit model are explained. Table 5 lists the descriptive statistics for the entire sample while Table 6 provides descriptive statistics for each rating group.

1.   Reserve Pay

Reserve pay was computed based on the assumption that a reservist maximizes their annual drill time. It was assumed that an individual would complete one weekend drill each month (12 months * 4 drills per month) and two weeks of annual active duty training (14 days of training) each year. This would give each individual 62 drills per year. Using the annual pay tables for military members, annual pay was calculated using the individual's paygrade and length of service. Annual pay data was obtained from the Defense Finance and Accounting Service.

The resulting pay was then indexed in real 1978 dollars using the Consumer Price Index obtained in the Economic Report of the President (2003). In real 1978 dollars, the average annual pay across this data was $1103. Surprisingly this was an average decrease in real pay of $33 from the period covered by Shiells (1986).

Table 5.   Descriptive Statistics for Pooled Sample

Number of NAVETs	388,637
Number of Affiliates	43,611
Average Real Reserve Wages (1978 $)	1,103
Average unemployment rate	5.7
Average age	23
Percent of NAVETs	
Affiliating	11.2
Male	86.8
Female	13.2
Married	36.8
White	67.2
Black	18.4
Hispanic	9.5
Other Race	5.0
With dependents	15.5
HS Grad	93.8
In paygrade E3	26.7
In paygrade E4	56.9
In paygrade E5	17.0
AFQT category 1	4.1
AFQT category 2	31.2
AFQT category 3A	21.6
AFQT category 3B	29.5
AFQT category 4 or lower	4.9
Region used for unemployment rate	
New England	2.7
Middle Atlantic	11.2
South Atlantic	18.7
East North Central	16.0
East South Central	5.0
West North Central	7.0
West South Central	12.4
Mountain	4.1
Pacific	6.9

Source: Author

Table 6.	Descriptive Statistics by Rating Groups

Rating Group	Seaman	Elect Equip Repair	Comms/ Intel	Medical	Admin/ Clerical	Mech Equip Rep -Av	Mech Equip Rep-Surf	Craftsman/ Technical	Service/ Supply	Non-Rates
Number of NAVETs	24,518	30,877	57,279	24,819	37,421	66,663	65,771	20,258	20,042	38,471
Number of Ratings	5	14	16	8	14	15	13	15	3	12
Percent of NAVETs										
Affiliating	16.3	4.4	9.9	13.1	11.8	11.0	8.2	10.2	11.5	19.7
Female	6.2	7.8	15.3	26.8	25.4	8.4	7.1	11.6	13.8	17.1
Married	33.0	39.7	34.4	45.9	39.6	37.9	36.9	40.6	37.7	27.2
Black	17.9	9.5	21.6	17.1	25.9	12.7	15.6	10.0	33.2	26.0
Hispanic	9.2	7.4	8.0	10.8	10.4	10.7	9.4	8.0	8.7	11.1
With dependents	14.9	14.9	13.6	16.9	17.3	15.7	16.3	18.7	19.0	12.0
non-HS Grad	7.7	5.3	6.0	4.6	5.8	7.6	5.7	7.8	5.3	5.9
AFQT category 1	2.7	11.9	3.8	3.1	2.8	2.3	7.6	2.1	0.7	1.1
AFQT category 3A	22.2	12.0	25.3	27.2	24.9	23.8	17.8	25.3	18.9	19.3
AFQT category 3B	33.9	5.1	22.2	21.3	27.7	31.9	31.7	31.0	49.3	45.7
AFQT category 4 or 5	9.2	0.3	2.5	1.1	3.6	4.1	6.8	5.1	10.1	8.7

Source: Author

22

2. Unemployment Rate

Unemployment data used in this study was based on annual, not seasonally adjusted, state unemployment rates taken from the Bureau of Labor Statistics. Unemployment data was assigned to individual NAVETs in the following way. If a NAVET affiliated with the SELRES then the NAVET's state of reserve duty was used to determine the unemployment rate. If the NAVET did not affiliate their active duty home-of-record was used to determine unemployment rate. This was done to better align the local unemployment rate, and thus local economic conditions, with the individual's location when they made the decision to affiliate. Finally, if no state data was available for an individual, then the national annual unemployment rate was assigned based on their year of separation. In all cases the calendar year of separation was used.

3. Paygrade

The predominant paygrade in the sample was E4, accounting for over 57 percent of NAVETs. Paygrade E3 made up another quarter in the sample, with the remainder dispersed among the other paygrades. Paygrade was only used in the preliminary models, not the final model being reported, due to collinerarity with age, length of service, and reserve pay (which is determined using paygrade and length of service).

4. Education and Ability

Rather than distinguish between high school graduate and non-high school graduate, this study used three variables to analyze education: high school graduate, non-high school graduate and those who earn their General Educational Development (GED) certificate. In many studies GED is assigned to the non-high school graduate category; however, it was maintained as a separate variable in this model. Over 94 percent of the NAVETs in the sample were high school graduates, with 3.5 percent GED certificate holders and less than 2.5 percent non-high school graduates.

In addition to high school diploma status, the NAVETs Armed Forces Qualification Test (AFQT) score category was used to determine their mental category. Categories I, II, IIIA and IIIB were modeled separately while categories IV and V were combined. The majority of NAVETs fell in AFQT categories II and IIIB, with 30 percent in each, followed by AFQT category IIIA with 21 percent. The other categories contained less than 5 percent of the sample of NAVETs.

5.   Personal / Demographic Characteristics

The model included marital status, race, gender, dependents, and age to determine the demographic influencers on affiliation. The base case in the model was a single, white, male with no dependents averaging 23 years of age. Four dummy variables were constructed for race so that white, black, hispanic, and all other races could be modeled separately. Marital status and dependent status were binary and based upon the NAVET's status at separation. Age was also the NAVET's age at time of separation.

6.   Geographic Regions

As noted in the section on the unemployment rate, each NAVET was assigned a state based upon either their active duty home-of-record or their reserve duty state (i.e., the state where they affiliated). These assignments were used to construct the unemployment rate; however, it would be too unwieldy to establish dummy variables for all 50 states, Washington D.C., as well as the three US territories found in the data. Instead, following the lead of Shiells (1986), the census regions as described in Table 7 were used to determine if regional differences influenced NAVET affiliation. Using census regions also helps alleviate some of the inaccuracy that occurs from using home-of-record, as many first-term separators do not return to their home-of-record upon separation but stay in the area where they served. The use of regions in the model helps to offset this problem.

Table 7.   Census Regions

Census Region	States
New England	ME, NH, VT, MA, RI, CT
Middle Atlantic	NY, NJ, PA
South Atlantic	DE, MD, DC, VA, WV, NC, SC, GA, FL
East North Central	MI, OH, IN, WI, IL
East South Central	KY, TN, AL, MS
West North Central	MN, IA, MO, ND, SD, NE, KS
West South Central	AR, LA, OK, TX
Mountain	MT, WY, CO, NM, ID, UT, AZ, NV
Pacific	WA, OR, CA, AK, HI

Source: U.S. Census Bureau (2005)

7. Ratings

Separate models were estimated for each of the 10 rating groups defined in Table 3 as well as a single model that included all rating groups.

8. Separation Year

Dummy variables were constructed for the NAVET's year of separation from active duty and included in all models. Affiliation rates by year are displayed in Table 8. The drawdowns that occurred in the early 1990s, and again at the beginning of this decade, are apparent. It is conceivable that active duty policies have had a greater effect on reserve affiliation decisions then expected.

Table 8. SELRES Affiliation Rates by Fiscal Year

Separation Year	Affiliation Rate
1990	15.0
1991	13.3
1992	10.8
1993	7.9
1994	8.9
1995	11.4
1996	12.2
1997	14.2
1998	12.9
1999	12.7
2000	10.5
2001	8.7
2002	7.2
Overall	11.2

Source: Author

E. ESTIMATION METHOD

The primary model that is estimated based on the above variable definitions is the following logit model:

$$\ln[(P_A / (1-P_A)] = \beta_0 + \beta_1 RESPAY + \beta_2 UNEMPLOY\_RATE + \beta_3 AFQT +$$
$$\beta_4 HS\_EDUC + \beta_5 DEPENDENT + \beta_6 GENDER +$$
$$\beta_7 RACE + \beta_8 MARRIED + \beta_9 AGE + \beta_{10} SEP\_YEAR +$$
$$\beta_{11} REGIONS + \beta_{12} RATINGS + u.$$

Maximum likelihood logit estimation is used. If a NAVET does not affiliate with the SELRES, $P_A = 0$. As stated earlier, estimation is done separately for each of the 10 rating groups as well as for all rating groups combined.

A number of additional models were constructed to test the thesis that there was a difference in affiliation over time. The first were constructed to determine if there was a difference between the drawdown years of the early 1990s versus the other years in the sample. A pooled model was constructed that excluded the dummy variables for separation year. Then two restricted models were constructed. One restricted model contained observations from separation years 1992 to 1994 only, while in the second restricted model, all separation years were included with the exception of 1992 to 1994.

A second hypothesis was tested to determine if a difference in affiliation could be attributed to the 'dot-com' boom and bust experienced in the late 1990s and at the turn of the century. Two models were constructed to test this thesis. The first model contained only the separation years 1997 to 1999, while the second model contained separation years 2000 to 2002.

IV. RESULTS

Overall the fit of the pooled model was good, with 39 of the 44 explanatory variables significant at the 1 percent level, and another four variables significant at the 5 percent level and a very high Chi-square statistic for the model. The logits from the pooled model are described in Table 9.

Table 9.   Maximum Likelihood Logit Coefficient Estimates for Pooled Model

	Pooled Group			Pooled Group
INTERCEPT	-2.4705		SERVICE / SUPPLY	-0.0369
	(0.1089) **			(0.0259)
RESPAY	0.0003		NON-RATES	0.5704
	(0.00009) **			(0.0204) **
UNEMPLOY RATE	0.1025		SEP_FY_90	0.6082
	(0.0049) **			(0.0227) **
FEMALE	0.0757		SEP_FY_91	0.3571
	(0.0156) **			(0.0221) **
MARRIED	-0.4064		SEP_FY_93	-0.3526
	(0.0138) **			(0.0243) **
BLACK	0.1632		SEP_FY_94	-0.1094
	(0.0141) **			(0.0251) **
HISPANIC	0.1912		SEP_FY_95	0.2377
	(0.0177) **			(0.0267) **
OTHER RACE	-0.0813		SEP_FY_96	0.3744
	(0.027) **			(0.0279) **
NON-HSGRAD	-0.0809		SEP_FY_97	0.5617
	(0.0365) *			(0.0261) **
GED	-0.1026		SEP_FY_98	0.5049
	(0.0294) **			(0.0303) **
CHILD	-0.048		SEP_FY_99	0.5282
	(0.0191) *			(0.0309) **
CURRENT AGE	-0.0323		SEP_FY_00	0.5465
	(0.0022) **			(0.0343) **
AFQT 1	-0.3862		SEP_FY_01	0.1942
	(0.036) **			(0.0327) **
AFQT 3A	0.0625		SEP_FY_02	-0.1269
	(0.0148) **			(0.0345) **
AFQT 3B	0.1878		NORTHEAST	0.2146
	(0.0139) **			(0.0316) **
AFQT 4A or 5	0.3482		MID-ATLANTIC	0.1253
	(0.0244) **			(0.0174) **
SEAMANSHIP	0.3738		SOUTH ATLANTIC	-0.0521
	(0.0217) **			(0.0159) **
ELECTRONIC EQUIP	-0.888		EAST SOUTH CENTRAL	0.0576
	(0.0312) **			(0.0248) *
COMMS / INTEL	-0.1402		WEST NORTH CENTRAL	0.4054
	(0.0192) **			(0.0218) **
MEDICAL	0.2769		WEST SOUTH CENTRAL	0.1851
	(0.0231) **			(0.0169) **
ADMIN / CLERICAL	0.0599		MOUNTAIN	-0.0781
	(0.0208) **			(0.0297) **
EQUIP REP SURFACE	-0.3473		PACIFIC	-0.4007
	(0.0192) **			(0.0268) **
CRAFTSMAN / TECH	-0.0551		Log-Likelihood Ratio	259,173.54
	(0.0267) *		Chi-Square	11,970.20
			Observations	386,119

(The maximum likelihood logit coefficient estimates for separate models for each of the 10 rating groups are presented in Table A-1 of Appendix A). Table 9 lists the parameter estimates from the pooled logit model. The logit is defined as the effect of a change in an explanatory variable on the log of the odds of a NAVET affiliating with the SELRES. Table A-2 of Appendix A presents the partial effects of the variables converted from logit coefficients. Partial effects are estimates of the change in the probability of a NAVET affiliating when each explanatory variable changes by one unit. The remainder of this section will be devoted to explaining the partial effects of some of the more influential and significant explanatory variables.

A. PAY AND UNEMPLOYMENT EFFECTS

Across all rating groups pay had a significant and positive effect on SELRES affiliation, with a $1000 increase in pay increasing the probability of affiliation by 1.8 percentage points. Within the 10 separate rating group models, pay was significant and positive at the 1 percent level in four out of 10 groups. Pay was significant and negative in two rating groups, Administration and Mechanical Equipment Repair - Aviation. This would infer that some unobserved factor affected these specific rating groups and that the unobserved factor was different for these and other rating groups.

Elasticities were used to measure the relative responsiveness of SELRES affiliation rates to changes in pay and changes in local unemployment rates. The pay elasticity is the percentage change in the affiliation rate due to a 1 percent change in reserve pay, as previously defined. The unemployment elasticity is the percentage change in affiliation rate due to a 1 percent change in the local unemployment rate. Table 10 lists the pay and unemployment elasticities derived from the separate models for the 10 individual rating groups as well as from the pooled model. Elasticities were computed using the equation $\beta_i \bar{X}_i (1-P_A)$ where P_A is the sample probability of affiliation, $\bar{X}_i$ is the mean explanatory variable and β_i is the estimated coefficient of $\bar{X}_i$. In this case both $\bar{X}_i$ and P_A are evaluated at their sample means. The elasticity is significant if the coefficient β is significant.

Of the six significant pay variables; three of the pay elasticities have become more elastic since the time of the Shiells (1986) study. This indicates that pay has a

different effect on individuals based upon their skill set, and that the effect of pay on affiliation decisions has not declined and may, in fact, have risen over time. It is of particular note that technical ratings are much more responsive to pay than non-technical ratings. This is logical because NAVETs with technical skills are more apt to find a quality job in the civilian sector that pays enough for them to maintain their utility level without the need to moonlight and take a part-time job. However, despite the findings in the individual rating groups, pay tends to be inelastic across all rating groups.

Table 10.   Pay and Unemployment Rate Elasticities by Rating Group

Rating Group	Pay	Unemployment Rate
Group 1: Seamanship	-0.47	0.23*
Group 2: Electronic Repair	1.44**	0.27
Group 3: Comms / Intel	1.76**	0.24**
Group 4: Medical	2.25**	0.40**
Group 5: Admin	-0.58*	0.31**
Group 6: Mechanical - Aviation	-1.63**	0.67**
Group 7: Mechanical - Surface	1.39**	0.66**
Group 8: Craftsman / Technical	0.31	0.55**
Group 9: Service	-0.45	0.75**
Group 10: Non-Rates	0.61	0.73**
All Rating Groups	0.25**	0.52**

** significant at the 1-percent confidence level
* significant at the 5-percent confidence level

Source: Based on Table A-1

The range of significant pay elasticities is from -1.63 for Mechanical Equipment Repair - Aviation to 2.25 for Medical ratings. Using the pay elasticity for the Communication and Intelligence ratings of 1.76, for example, affiliation rates will increase by 1.76 percent for every 1 percent increase in reserve pay. The average real reserve pay for this rating group was $1,133, so a 10 percent increase in real reserve pay would increase the affiliation rate by 17.6 percent, from 9.9 to 11.6 (the initial affiliation rate was taken from Table 6). The two significant and negative pay elasticities seem implausible. It would seem unlikely that any skill set would be less apt to affiliate when

pay is increased, indicating that the model is not accounting for factors that affect affiliation, at least for these two rating groups.

Table 10 shows that the unemployment rate elasticity is significant in nine of the 10 rating groups as well as across all rating groups. Using the unemployment rate elasticity for the Communication and Intelligence ratings of 0.24 as an example, affiliation rates will increase by .24 percent for every 1 percent increase in unemployment rate. The average unemployment rate for this rating group was 5.7 percent, so a 10 percent increase in unemployment rate would increase the affiliation rate by .57 percent, from 0.24 to 0.38 NAVETs. Overall, the unemployment rate elasticity has remained relatively constant and inelastic across rating groups. These findings compare very closely with those of Shiells (1986), indicating that the unemployment effect has not changed with regard to its effect on affiliation across the two periods analyzed, and that an increase in unemployment rate increases SELRES affiliation.

B. REGIONAL EFFECTS

The partial effect of the probability of affiliation based upon a NAVET's census region is given in Table 11 for both the pooled model and the individual rating groups. The baseline region is the East North Central region, thus all effects are the estimated changes in the probability of affiliation if the NAVET lived in a given region vice the East North Central region. Across all rating groups, census region is significant in every region with NAVETs in the South Atlantic, Mountain, and Pacific regions less likely to affiliate than those in all other regions. NAVETs in the mid-western regions and New England had the highest affiliation rates.

In the separate occupational rating group regressions, 80 regional coefficients were estimated based on eight regions and 10 rating groups. Of these, 40 estimates were significant, 28 being significant and positive and the remaining 12 being significant and negative. The West North Central was positive and significant in all 10 rating groups, while the West South Central was positive and significant in eight of 10 rating groups. The New England and Mid-Atlantic regions were also significant and positive in four and five of the rating groups respectively. Only the Pacific region, with nine of 10 significant and negative estimates, showed any consistently negative affiliation trends. The South Atlantic, East South Central and Mountain regions showed little significance across

rating groups, and thus there is not apt to be any differences between affiliation rates these regions and the base region, the East North Central. The significant estimates from the four significantly positive regions (West North Central, West South Central. Mid-Atlantic, and New England) ranged from .0007 to .0997. Using Group 8, Craftsman, in the West North Central as an example, 4.8 more NAVETs in this rating group are expected to affiliate per 100 then will affiliate from the East North Central region. Likewise, 6.7 fewer NAVETs in this rating group, from the Pacific region, are expected to affiliate per 100 as compared to the East North Central region.

Interestingly, it is two of the heartland regions that have the highest probability of affiliation, while the Pacific region, one of the Navy's central locations had a lower probability of affiliation as compared to the East North Central. There are any number of reasons for the differences, including lifestyle choices, civilian job opportunities, rural versus urban environments, and cost of living. However, because both annual reserve pay and unemployment rate by state were factored into the model the reasons are independent of these factors and attributable to a factor not observed in the model.

Table 11.   Partial Effect of Regional Variables on P_A

	Pooled Ratings	Seaman	Elect Eq Repair	Comms/ Intel	Medical	Admin/ Clerical	Mech Eq Rep -Av	Mech Eq Rep-Surf	Craftsman/ Technical	Service/ Supply	Non- Rates
New England	0.0169 **	0.0141	0.0007	0.0040 *	0.0010	0.0346	0.0406 *	0.0023 **	0.0107	0.0104	0.0423 **
Middle Atlantic	0.0095 **	0.0325 *	-0.0003	0.0018	0.0012	0.0190	0.0203 *	0.0011 **	0.0236 *	0.0048	0.0185 **
South Atlantic	-0.0037 **	-0.0326 *	-0.0005	-0.0022 **	-0.0001	-0.0001	-0.0097	-0.0003	-0.0091	-0.0111	0.0003
East South Central	0.0042 *	0.0270	-0.0005	-0.0010	0.0022	0.0266 *	-0.0081	0.0005	0.0047	0.0186	0.0102
West North Central	0.0346 **	0.0997 **	0.0034 **	0.0081 **	0.0070 **	0.0753 **	0.0815 **	0.0023 **	0.0476 **	0.0867 **	0.0650 **
West South Central	0.0144 **	0.0702 **	0.0011	0.0034 **	0.0040 **	0.0260 **	0.0448 **	0.0007 **	0.0155	0.0219 *	0.0297 **
Mountain	-0.0054 **	-0.0254	-0.0004	-0.0033 *	0.0017	-0.0100	-0.0222	-0.0003	-0.0100	-0.0185	-0.0132
Pacific	-0.0244 **	-0.1695 **	-0.0002	-0.0080 **	-0.0022 *	-0.0688 **	-0.0963 **	-0.0010 **	-0.0669 **	-0.0512 **	-0.0496 **

** significant at the 1-percent confidence level
* significant at the 5-percent confidence level

Source: Based on Table A-1

C. PERSONAL CHARACTERISTICS

Table 12 depicts the partial effects of the personal characteristic variables in the model. In the pooled model (containing all rating groups), gender, marital status, race, dependent status, and age at separation were all significant. Overall, being a female increases the probability of affiliating in the SELRES by .56 percentage points, being married decreases the probability of affiliation by 2.46 percentage points, being Black or Hispanic increases the probability of affiliating by 1.26 and 1.49 percentage points respectively, while being of an "other" ethnic minority decreases the probability by .56 percentage points. Having a child decreases the probability of affiliation by .34 percentage points. Thus, a married person with a child is nearly 3 percentage points less likely to affiliate. For each year of age over 23 years old at separation the probability of affiliation is reduced by .23 percentage points.

Looking at the 10 rating groups separately (see Appendix A, Table A-2) the partial effect of being female is significant in only four of the 10 rating groups; it is significant and negative in the communications and intelligence ratings. The partial effect of being married is significant and negative in all 10 of the rating groups, which may indicate that when married, time and family issues take priority over money. Alternatively, it may be that marriage provides an opportunity to have a dual-income family and thus reduces the need for a part-time job. The partial effect of being Black is significant and positive in six rating groups and the partial effect of being Hispanic is significant and positive in five of the rating groups, suggesting that minorities are more apt to take part-time jobs than whites. However, this could also reflect the occupational skill sets of minorities and their ability to obtain a quality job in the civilian sector. NAVETs of 'other' ethnicity have a negative probability of affiliating with the SELRES that is significant in three of the 10 rating groups, suggesting that culture and ethnicity have differing effects on affiliation probabilities. The partial effects of having a child are only significant in three rating groups, all of which are negative. This is somewhat counterintuitive because there is an expectation that increased pay would be required for a larger family. However, this suggests that quality of life outweighs the increased pay that would come from affiliating with the SELRES. Finally, the partial effect of age at

33

separation is significant and negative in eight of the 10 rating groups. The older a NAVET is at the time of separation, the less likely they are to affiliate.

D.   EDUCATION AND MENTAL CATEGORY

Table 13 shows that across all rating groups the partial effect of both education, as measured by high school diploma, and AFQT mental category are significant. Not surprisingly, the partial effect of being a non-high school graduate or a GED holder are negative. This concurs with relationships found in previous studies. Across the 10 rating group models, the partial effect of being a non-high school graduate is significant in five rating groups; however, three of these are negative and two are positive. The two rating groups with positive and significant partial effects, Electronic Technician and Mechanical Equipment Repair - Surface, both have more highly educated individuals within the ratings. Only two of the 10 rating groups had a significant partial effect for GED, and both of these are negative.

In the pooled ratings model, the partial effect of mental category falls in line with what is expected. Those in AFQT category I are less likely to affiliate with the SELRES because they have the ability to get a quality civilian job, which reduces their need for part-time employment. The partial effect for NAVETs in AFQT categories IIIA and higher have a higher probability of affiliating than the baseline NAVET in AFQT category II, and this probability increases as the AFQT category increases. This leads to the belief that the lower the mental group, the less apt the NAVET is to obtain a quality civilian job and thus the higher the probability they will affiliate with the SELRES to make up for the lower income obtained in the civilian sector.

Across the 10 rating groups, the partial effect of being in AFQT category I is significant and negative in four of the 10 rating groups. The partial effect of AFQT category IIIA is significant in six rating groups; however, the signs are not consistent, with two being negative and four being positive. As the mental category decreases the number of positive estimates increases. The partial effect for AFQT category IIIB is significant and positive in five of the 10 rating groups, while for AFQT category IV and V the effect is significant and positive in seven of the 10 groups.

Table 12. Partial Effect of Personal Characteristics on P_A

	Pooled Ratings	Seaman	Elect Eq Repair	Comms/ Intel	Medical	Admin/ Clerical	Mech Eq Rep -Av	Mech Eq Rep-Surf	Craftsman/ Technical	Service/ Supply	Non- Rates
FEMALE	0.0056 **	-0.0029	-0.0003	-0.0017 *	-0.0006	0.0652 **	0.0314 **	0.0013 **	0.0015	0.0115	-0.0061
MARRIED	-0.0246 **	-0.1057 **	-0.0025 **	-0.0074 **	-0.0048 **	-0.0680 **	-0.0779 **	-0.0013 **	-0.0445 **	-0.0456 **	-0.0363 **
BLACK	0.0126 **	-0.0090	0.0002	0.0033 **	-0.0010	0.0194 **	0.0414 **	0.0015 **	-0.0125	0.0251 **	0.0416 **
HISPANIC	0.0149 **	0.0112	0.0008	0.0051 **	-0.0003	0.0382 **	0.0636 **	0.0017 **	0.0094	0.0147	0.0201 **
OTHER RACE	-0.0056 **	-0.0431	-0.0006	0.0013	-0.0043 **	-0.0278 *	-0.0081	0.0007 *	-0.0022	-0.0421 **	-0.0003
CHILD	-0.0034 *	0.0151	-0.0018 **	-0.0019	-0.0003	0.0013	-0.0054	-0.0005 *	-0.0248 *	-0.0144	0.0099
CURRENT AGE	-0.0023 **	-0.0191 **	0.0001	-0.0005 **	-0.0004 **	-0.0047 **	-0.0069 **	0.0000	-0.0082 **	-0.0058 **	-0.0068 **

** significant at the 1-percent confidence level
* significant at the 5-percent confidence level

Source: Based on Table A-1

Table 13. Partial Effect of Education and AFQT on P_A

	Pooled Ratings	Seaman	Elect Eq Repair	Comms/ Intel	Medical	Admin/ Clerical	Mech Eq Rep -Av	Mech Eq Rep-Surf	Craftsman/ Technical	Service/ Supply	Non- Rates
NON-HSGRAD	-0.0056 *	-0.0125	0.0063 **	-0.0018	0.0018	-0.0453 *	-0.0551 **	0.0011 *	-0.0196	-0.0254	-0.0314 **
GED	-0.0071 **	-0.0313	-0.0005	-0.0014	0.0002	-0.0430 **	-0.0111	0.0000	-0.0250	-0.0246	-0.0197 **
AFQT 1	-0.0236 **	-0.0246	-0.0015 **	-0.0032 *	-0.0018	0.0050	-0.0258	-0.0029 **	-0.0479	-0.0639	-0.0378 **
AFQT 3A	0.0046 **	-0.0169	0.0038 **	0.0026 **	0.0015 *	-0.0051	-0.0179 *	0.0028 **	0.0059	-0.0086	-0.0156 **
AFQT 3B	0.0146 **	0.0399 **	0.0084 **	0.0072 **	0.0032 **	0.0017	-0.0085	0.0040 **	0.0051	0.0099	0.0073
AFQT 4A or 5	0.0290 **	0.0763 **	0.0095 **	0.0116 **	0.0082 **	-0.0059	0.0011	0.0071 **	0.0235	0.0407 **	0.0209 **

** significant at the 1-percent confidence level
* significant at the 5-percent confidence level

Source: Based on Table A-1

E. RATING GROUPS

Thus far P_A has been determined across the 10 rating groups. However, it is also appropriate to estimate the partial effect of the rating groups themselves relative to the baseline rating group, Group 6, Mechanical Equipment Repair - Aviation. Table 14 displays the partial effects of the rating group dummy variables themselves as determined from the pooled model (based on Table A-2).

Of the nine rating groups, four were significant and positive and four were significant and negative. The omitted rating group is Mechanical Equipment Repair - Aviation. Only rating Group 9, Service Ratings, was not significant. The rating groups with negative partial effects are the more technically oriented occupations indicating that the probability of affiliating with the SELRES decreases when a NAVET is trained in a technical skill. These NAVETs have better opportunities for good civilian primary jobs and thus lower demand for part-time, moonlighting jobs. On the other hand, the four rating groups with significant and positive partial effects include Non-Rates and Seamanship ratings such as Boatswain's Mate. For example, a NAVET in the Seamanship rating group has a probability of affiliating with the SELRES that is 3.15 percentage points higher than a NAVET in the Mechanical Equipment Repair - Aviation rating group. Likewise, a NAVET in a technical rating group such as Electronic Equipment repair has a 4.43 percentage point lower probability of affiliating than the Aviation Mechanic.

Table 14.   Partial Effects of Rating Groups on P_A

Rating Groups	Partial Effect
Group 1: Seamanship	0.0315 **
Group 2: Electronic Repair	-0.0443 **
Group 3: Comms / Intel	-0.0095 **
Group 4: Medical	0.0224 **
Group 5: Admin	0.0044 **
Group 6: Mechanical - Aviation	Baseline
Group 7: Mechanical - Surface	-0.0216 **
Group 8: Craftsman / Technical	-0.0039 *
Group 9: Service	-0.0026
Group 10: Non-Rates	0.0521 **

** significant at the 1-percent confidence level
 * significant at the 5-percent confidence level
Source: Based on Table A-1

36

F. DIFFERENCES IN AFFILIATION OVER TIME: THE DRAWDOWN YEARS

The partial effect of each separation year dummy in the pooled model was highly significant in comparison to the baseline year of 1992. While nine years had significant and positive coefficients, three years--1993, 1994, and 2002-- had negative coefficients. Rather than focus on these partial effects, this study looks at the possibility that the determinants of affiliation rates during the drawdown years of 1992 through 1994 differed from the other years in the sample. Three separate models were constructed to test this theory. The unrestricted (pooled) model was based on the full sample and contained all variables found in the previous model with the exception of the separation year dummies. Two restricted models were then constructed, one based on a sample of NAVETs who separated between 1992 and 1994, the other containing NAVETs from all separation years except 1992 to 1994. The full logit model results are displayed in Appendix B. A log likelihood ratio test conducted on the results indicated that the two time periods were in fact different and that pooling of the model is not acceptable. Table 15 depicts the partial effects from the two restricted models, while Table 16 depicts the Pay and Unemployment Rate elasticities from the models.

The log likelihood ratio test rejected the hypothesis that the estimated parameters in the two models are the same and thus two separate models are required to properly describe the effect in the two periods. Despite these differences however, there is mainly a difference in magnitude across the two models. Although nine of the 32 explanatory variables differed in significance across the two models, 20 explanatory variables were significant in both models, all showing the same sign, indicating that it is only the magnitude, not significance, which differs. Further, of these 20, 13 of the explanatory variables had a smaller effect in the 1992 to 1994 model than in the model containing observations from the non-drawdown years. The years during the drawdown reduced the probability a NAVET would affiliate in the SELRES, when the sign was positive, and if the partial effects had a negative sign the drawdown years had a smaller effect on decreasing affiliation. For example, a Black NAVET during the drawdown years has a 2.1 percentage point increase in his probability of affiliating relative to a White NAVET, while in the years outside the drawdown there is a 2.7 percentage point increase in the

Table 15.   Partial Effects of Separate Models for 1992-94 and Other Years

	Sample = 1992-1994	Sample = 1990-1991 and 1995-2002
CONSTANT	0.1166	0.2984
RESPAY	-0.00004 *	-0.0001 **
UNEMPLOY RATE	0.0090 **	0.0182 **
FEMALE	0.0110 **	0.0103 **
MARRIED	-0.0347 **	-0.0746 **
BLACK	0.0213 **	0.0272 **
HISPANIC	0.0061	0.0463 **
OTHER RACE	-0.0401 **	-0.0062
NON-HSGRAD	-0.0023	-0.0134
GED	-0.0099	-0.0281 **
CHILD	0.0003	-0.0097 *
CURRENT AGE	-0.0028 **	-0.0064 **
AFQT 1	-0.0325 **	-0.0782 **
AFQT 3A	0.0140 **	-0.0027
AFQT 3B	0.0274 **	0.0252 **
AFQT 4A or 5	0.0494 **	0.0788 **
SEAMANSHIP	0.0484 **	0.0926 **
ELECTRONIC REPAI	-0.0561 **	-0.1563 **
COMMS / INTEL	-0.0014	-0.0294 **
MEDICAL	0.0478 **	0.0456 **
ADMIN / CLERICAL	-0.0011	0.0229 **
MECH REP - SURF	-0.0291 **	-0.0628 **
CRAFTSMAN / TECH	0.0006	-0.0104
SERVICE / SUPPLY	-0.0016	-0.0057
NON-RATES	0.0928 **	0.0946 **
New England	0.0493 **	0.0262 **
Middle Atlantic	0.0195 **	0.0195 **
South Atlantic	-0.0008	-0.0207 **
East South Central	0.0264 **	-0.0090
West North Central	0.0617 **	0.0691 **
West South Central	0.0391 **	0.0212 **
Mountain	-0.0148 *	-0.0261 **
Pacific	-0.0818 **	-0.0757 **
Log Likelihood Ratio	71,295.16	188,520.15
Chi-Squared	3,519.80 **	7077.42 **
Observations	121,554	264,565
P_A	0.0923	0.1214

Source: Based on Table B-1

probability of a Black NAVET affiliating. Where the partial effects are negative, such as marital status, an individual in the drawdown years is less likely to affiliate by almost 3.5 percentage points, while in the years outside the drawdown there is an 7.5 percentage point decrease in a NAVET's probability of affiliation. One possible explanation for this may be that NAVETs felt unwanted by the Navy as a whole during the drawdown and

thus they had less desire to affiliate with the SELRES. Or, another possible explanation is that those NAVETs who opted for one of the separation bonuses being offered during this timeframe were unable to affiliate with the SELRES as a result of conditions placed upon the acceptance of the bonus.

Table 16.   Pay and Unemployment Elasticities for 1992-1994 and Other Years

	Pay	Unemployment Rate
Separation Years 1992-1994	-0.41 *	0.52 **
Separation Years 1990-1991 and 1995-2002	-0.69 **	0.39 **

** significant at the 1-percent confidence level
* significant at the 5-percent confidence level
Source: Based on Table B-1

The pay effect, which is inelastic in both models, does not appear to be a good indicator as it is significant and negative in both models. A difference in magnitude does exist between the two models; however, it is unlikely that an increase in pay would decrease affiliation rates, and thus the outcome is suspect. The unemployment rate elasticity is significant in both restricted models and falls in line with the results previously discussed. It is inelastic overall, but the sign demonstrates that affiliation in the SELRES increases as the unemployment rate increases. Again, there is a difference in magnitude between the two models, and it falls in line with the fact that the average annual unemployment rate during the drawdown years was higher than during the non-drawdown years. For each one percent increase in the unemployment rate, SELRES affiliation in the drawdown period increased by .52 percent as opposed to a .39 percent increase in the non-drawdown years.

G.   DIFFERENCES IN AFFILIATION OVER TIME: THE 'DOT-COM' BOOM

The final hypothesis in this study is that the probability of affiliation with the SELRES differed during the technical employment (dot-com) boom of the late 1990s and the years at the beginning of the millennium when the boom turned to a bust. To see if

there was a difference, two time periods were chosen, 1997 to 1999, which represent the tech boom years, and 2000 to 2002, which represent the tech bust years. Using the same procedure described above, separate models were estimated for each period and a log likelihood ratio test was run on the models to test the hypothesis that their betas were the same. The results concluded that the two periods were different, and thus different models were required to determine the effects. Table 17 displays the partial effects of the two models (Appendix C displays complete logit results).

Table 17. Partial Effects of Separate Models for 1997-1999 and 2000-2002

	Sample = 1997-1999		Sample = 2000-2002	
CONSTANT	0.0096		0.1122	
RESPAY	0.00002	**	0.000005	
UNEMPLOY RATE	0.0022	**	-0.0087	**
FEMALE	0.0025	**	0.0267	**
MARRIED	-0.0027	**	-0.0276	**
BLACK	0.0028	**	0.0146	**
HISPANIC	0.0041	**	0.0332	**
OTHER RACE	0.0019	**	0.0088	
NON-HSGRAD	-0.0006		0.0209	
GED	-0.0002		-0.0037	
CHILD	-0.00005		-0.0141	
CURRENT AGE	-0.0001	**	0.0012	*
AFQT 1	-0.0050	**	-0.0308	**
AFQT 3A	-0.0003		-0.0156	**
AFQT 3B	0.0016	**	-0.0133	**
AFQT 4A or 5	0.0128	**	-0.0706	
SEAMANSHIP	0.0041	**	0.0270	**
ELECTRONIC REPAIR	-0.0069	**	-0.0709	**
COMMS / INTEL	-0.0027	**	-0.0067	
MEDICAL	-0.0022	**	0.0404	**
ADMIN / CLERICAL	0.0005		0.0023	
MECH REP - SURF	-0.0022	**	-0.0045	
CRAFTSMAN / TECH	-0.0014	*	-0.0003	
SERVICE / SUPPLY	-0.0006		0.0059	
NON-RATES	0.0046	**	0.0295	**
New England	-0.00002		-0.0300	**
Middle Atlantic	-0.0018	**	-0.0085	
South Atlantic	-0.0009	**	-0.0230	**
East South Central	-0.0012	*	-0.0100	
West North Central	0.0038	**	-0.0005	
West South Central	-0.0004		0.0028	
Mountain	-0.0018	**	-0.0067	
Pacific	-0.0017	**	-0.0038	
Log Likelihood Ratio	51,376.56		39,112.59	
Chi-Squared	2,048.37	**	938.99	**
Observations	67,848		67,377	
P_A	0.1338		0.0877	

Source: Based on Table C-1

The partial effects of the two models indicate that the coefficients, overall, differ in both significance and magnitude. Of the 15 explanatory variables that are significant in both models, 11 have the same sign and in each case the coefficients from the 1997-1999 sample are smaller in magnitude than for the 2000-2002 sample. In addition, nine explanatory variables are significant in the 1997-1999 sample but not in the 2000-2002 sample. Given that the two samples have roughly the same number of observations this would lead us to believe that the ability to predict the probability of affiliation during boom years is better than in the uncertainty of the bust years.

Table 18 displays the pay and unemployment elasticities associated with these two periods.

Table 18.   Pay and Unemployment Elasticities for Boom and Bust Years

	Pay	Unemployment Rate
Separation Years 1997-1999 ('Boom')	1.90 **	0.85 **
Separation Years 2000-2002 ('Bust')	0.05	-0.40 **

** significant at the 1-percent confidence level
* significant at the 5-percent confidence level

Source: Based on Table C-1

To reinforce what can be determined from the estimated partial effects of the 1997-1999 boom period, significant and positive elasticities exist for both pay and unemployment during this period. Pay is highly elastic, an expected result of the tech boom, while the unemployment elasticity is the highest seen over all of the years included in the sample. As for the bust period of 2000-2002, pay is not significant, while unemployment is oddly significant and negative. This is a surprising result because one would expect that during a bust, when the unemployment rate increases, affiliation also would increase. However, based upon this result a one percent increase in the unemployment rate would result in a .40 percent decrease in the affiliation rate. It is recommended that this last finding be tested again once more data becomes available from the bust period. The 'dot-com' bust did not start until mid-2000, so only a little over one year of affiliation data is included in our sample. Analysis of a more extensive data set with more affiliation decisions may reveal a different pattern of relationships.

THIS PAGE INTENTIONALLY LEFT BLANK

V.   CONCLUSIONS, LIMITATIONS, AND RECOMMENDATIONS

A.   CONCLUSIONS

This study was conducted to determine if changes in the factors that affect the affiliation of naval veterans in the SELRES have changed since the study conducted by Shiells (1986) in the early 1980s. The major findings in this study are described below.

SELRES affiliation continues to be an economic decision. The theory of the decision to work and the concept of moonlighting are still sound theories that apply to SELRES affiliation. Overall, reserve pay has a significant and positive effect on NAVET decisions to affiliate with the SELRES. However, although pay was statistically significant in six out of 10 rating groups, its effect was smaller than estimated in the earlier study of the early 1980s (Shiells, 1986).

As expected, the unemployment rate had a significant and positive effect on NAVET affiliation in the SELRES. The higher the unemployment rate the greater the probability of NAVET affiliation with the SELRES. Although unemployment rate elasticities proved to be inelastic across all rating groups, the significant and positive trend toward affiliation was consistent with the early 1980s study.

NAVET affiliation rates varied across Census regions. Because pay and unemployment rate were taken into account in the models, the variation across regions is likely attributable to economic factors such as cost of living, or non-pecuniary factors, such as patriotism. Note, too, that affiliation rates will vary across regions due to the location of Reserve Centers and units.

Demographic indicators such as gender, race, marital status, dependents, and age are significant predictors of NAVET affiliation. Female NAVETs have a higher probability of affiliation in the SELRES then males. Blacks and Hispanics have a higher probability of affiliation then Whites. Married NAVETS have a lower probability of affiliation then single NAVETs. NAVETs with children have a lower probability of affiliation then NAVETs with no children, and finally, the older a NAVET, the less likely they are to affiliate.

43

In concurrence with previous research, high school graduates have a significantly higher probability of affiliation then non-high school graduates or GED holders. This is likely due to requirements that applicants be high school diploma graduates. On the other hand, lower mental (test score) categories have a higher probability of affiliation than higher mental categories, more than likely due to the better civilian job prospects of the higher mental groups.

The probability of NAVET affiliation in the SELRES is significantly different across rating groups. Technically skilled ratings tend have a lower probability of affiliation than groups with less technically skilled ratings. This is understandable because NAVETs in technical ratings have better job opportunities in the civilian sector. However, the different affiliation rates also likely reflect differences in demand for accessions into different ratings, as well as supply decisions

Policy decisions established by the active duty Navy affect the probability of affiliation of NAVETs in the SELRES. The magnitude of the determinants of the probability of affiliation during the drawdown years of 1992 to 1994 were significantly different than during the non-drawdown years. For example, the effect of pay on affiliation was smaller during the drawdown period. In addition, the determinants of affiliation rates during the 'dot-com' boom of the late 1990s proved to be significantly different from those during the 'dot-com' bust at the turn of the century. Of particular note was how elastic pay was during the tech boom, with a highly positive effect on affiliation.

An interesting sidenote discovered during the course of the study is that average military pay has remained fairly constant over the past two decades. In real 1978 dollars, current pay averaged $1,103 across the data in this study, while it averaged $1,136, in real 1978 dollars, in Shiells (1986). An average net loss of $33 over two decades. This indicates that base pay increases across this period were in line with inflation. Therefore, it is expected that the same economic factors determined to be significant by Shiells (1986) would still be significant in this study, which was found to be true for the most part.

B.   LIMITATIONS

There are two unique features of this study that limited the research. The first is that the data set used had no information on which NAVETs were offered bonuses to affiliate. Thus, the pay variable did not include the effect of bonuses on affiliation decisions, nor were we able to include bonuses as an explanatory variable in the model. This limitation potentially reduces the estimated pay effect on affiliation.

Secondly, Enlisted Career Management Objectives (ECMO) categories were not used as a demand side constraint. The tracking of ever-changing ECMO categories across the period involved, the tracking of the number of NAVETs that used the RESCORE-R program to change ratings in order to affiliate in the SELRES, and the tracking of the number of NAVETs who affiliated in the SELRES under rating waivers, were beyond the scope of this study.

C.   RECOMMENDATIONS

The first recommendation stems directly from the limitations just discussed. The inclusion of SELRES bonus information and the exclusion of NAVETs in overmanned ECMO categories should be accounted for in future research to provide a more robust data set from which to model.

The idea that active duty Navy policy decisions have a direct effect on NAVET affiliation in the SELRES is something that requires further study. As the Navy continues to integrate and maneuver within the Total Force environment it is vital that policy decisions are made with the knowledge that they may affect NAVET affiliation decisions. To fully understand this concept it is recommended that this study be repeated once quality data becomes available to assess the impact of operational and personnel tempo on NAVET affiliation decisions in the post-9/11 Navy. Although this study found significant differences between the drawdown years and non-drawdown years, as well as during the boom and bust years associated with the tech industry, there was insufficient data to study any potential 9/11 effects. However, based on the findings in this study it can be theorized that there will be significant differences in post-9/11 NAVET affiliation decisions due to changes in the Navy's tempo policies, and the increased possibility that a SELRES will be mobilized.

Finally, because this study confirmed that NAVET affiliation in the SELRES is, in fact, an economic decision, it is recommended that bonuses be applied to ratings that prove to have higher pay elasticities. Using the pay elasticities determined in this study, the Navy Recruiting Command could target bonuses and incentives toward specific skill sets in order to maximize the Navy's return-on-investment while at the same time meeting their manning requirements.

APPENDIX A. MAXIMUM LIKELIHOOD LOGIT COEFFICIENTS AND PARTIAL EFFECTS FOR POOLED MODEL AND INDIVIDUAL RATING MODELS

Table A-1.   Maximum Likelihood Logit Coefficient Estimates for Separate Rating Groups

Group	Pooled Ratings	Seaman	Elect Eq Repair	Comms/ Intel	Medical
INTERCEPT	-2.4700	0.2031	-5.1843	-3.8370	-4.2779
	(0.1089) **	(0.3962)	(.0.0154) **	(0.3023) *¹	(0.3644) **
RESPAY	0.0003	-0.0005	0.0013	0.0017	0.0024
	(0.0001) **	(0.0003)	(0.0004) **	(0.0002) *¹	(0.0003) **
UNEMPLOY RATE	0.1025	0.0465	0.0520	0.0472	0.0806
	(0.005) **	(0.0168) **	(0.0281)	(0.0144) *¹	(0.0178) **
FEMALE	0.0757	-0.0177	-0.0569	-0.0857	-0.0480
	(0.0156) **	(0.0765)	(0.1108)	(0.0419) *	(0.0458)
MARRIED	-0.4064	-0.4243	-0.6136	-0.4406	-0.4411
	(0.0138) **	(0.0491) **	(0.0737) **	(0.0381) *¹	(0.0452) **
BLACK	0.1632	-0.0365	0.0366	0.1467	-0.0745
	(0.0141) **	(0.0504)	(0.096)	(0.0371) *¹	(0.0554)
HISPANIC	0.1912	0.0452	0.1375	0.2213	-0.0192
	(0.0177) **	(0.0628)	(0.1058)	(0.0516) *¹	(0.0634)
OTHER RACE	-0.0813	-0.1732	-0.1152	0.0629	-0.3832
	(0.0270) **	(0.1101)	(0.1715)	(0.0921)	(0.0873) **
NON-HSGRAD	-0.0809	-0.0502	0.7641	-0.0924	0.1253
	(0.0365) *	(0.101)	(0.1707) **	(0.0957)	(0.1476)
GED	-0.1026	-0.1259	-0.0927	-0.0694	0.0147
	(0.0294) **	(0.0969)	((0.1603)	(0.0834)	(0.1166)
CHILD	-0.0480	0.0614	-0.3823	-0.0981	-0.0192
	(0.0191) *	(0.66)	(0.1173) **	(0.0558)	(0.0643)
CURRENT AGE	-0.0323	-0.0768	0.0091	-0.0225	-0.0317
	(0.002) **	(0.0089) **	(0.0113)	(0.0064) *¹	(0.0072) **
AFQT 1	-0.3862	-0.0990	-0.3253	-0.1692	-0.1427
	(0.0360) **	(0.1197)	(0.1068) **	(0.0855) *	(0.1202)
AFQT 3A	0.0625	-0.0679	0.5207	0.1199	0.1056
	(0.0148) **	(0.0516)	(0.0777) **	(0.0374) *¹	(0.0490) *
AFQT 3B	0.1878	0.1628	0.9283	0.3015	0.2123
	(0.0139) **	(0.0466) **	(0.097) **	(0.0391) *¹	(0.0546) **
AFQT 4A or 5	0.3484	0.3157	1.0045	0.4484	0.4782
	(0.0244) **	(0.0693) **	(0.3181) **	(0.0844) *¹	(0.1655) **
NORTHEAST	0.2146	0.0572	0.1199	0.1764	0.0741
	(0.0316) **	(0.1071)	(0.1644)	(0.0885) *	(0.1314)
MID-ATLANTIC	0.1253	0.1326	-0.0600	0.0844	0.0872
	(0.0174) **	(0.0579) *	(0.1010)	(0.0472)	(0.0664)
SOUTH ATLANTIC	-0.0521	-0.1309	-0.0940	-0.1118	-0.0072
	(0.0159) **	(0.0543) *	(0.0869)	(0.0420) *¹	(0.0585)
EAST SOUTH CENTRAL	0.0576	0.1098	-0.0907	-0.0506	0.1502
	(0.0248) *	(0.082)	(0.1437)	(0.0676)	(0.0939)
WEST NORTH CENTRAL	0.4054	0.4172	0.4777	0.3343	0.4182
	(0.0218) **	(0.0713) **	(0.1103) **	(0.0607) **	(0.0857) **
WEST SOUTH CENTRAL	0.1851	0.2898	0.1805	0.1516	0.2613
	(0.0169) **	(0.0575) **	(0.0936)	(0.0460) **	(0.0607) **
MOUNTAIN	-0.0781	-0.1024	-0.0704	-0.1761	0.1205
	(0.0297) **	(0.1014)	(0.1522)	(0.0860) *	(0.1003)
PACIFIC	-0.4007	-0.6879	-0.0297	-0.4839	-0.1745
	(0.0268) **	(0.1046) **	(0.1249)	(0.793) **	(0.0864) *
Log likelihood ratio	259,173.54	21,002.91	10,533.52	35,955.73	18,660.13
Chi-Square	11,970.20 **	771.43 **	514.09 **	950.46 **	642.63 **
Observations	386,119	24,518	30,877	57,279	24,819

47

Group	Admin/ Clerical	Mech Eq Rep -Av	Mech Eq Rep-Surf	Craftsman/ Technical	Service/ Supply	Non- Rates
INTERCEPT	-1.2822	-0.6001	-5.4015	-1.6135	-1.6294	-1.9556
	(0.3162) **	(0.2415) *	(0.3093) **	(0.4481) **	(0.4394) **	(0.6534) **
RESPAY	-0.0006	-0.0020	0.0014	0.0003	-0.0005	0.0008
	(0.00025) *	(0.00019) **	(0.0002) **	(0.0003)	(0.0003)	(0.00068)
UNEMPLOY RATE	0.0620	0.1334	0.1246	0.1062	0.1445	0.1562
	(0.0160) **	(0.0110) **	(0.0141) **	(0.0232) **	(0.0207) **	(0.0129) **
FEMALE	0.3493	0.1348	0.2565	0.0108	0.0814	-0.0571
	(0.0367) **	(0.0447) **	(0.0534) **	(0.0773)	(0.0674)	(0.0379)
MARRIED	-0.4585	-0.3621	-0.3360	-0.3638	-0.3792	-0.3869
	(0.0412) **	(0.0323) **	(0.0380) **	(0.0600) **	(0.0609) **	(0.0387) **
BLACK	0.1104	0.1769	0.2910	-0.0934	0.1729	0.3381
	(0.0415) **	(0.0388) **	(0.0396) **	(0.0851)	(0.0537) **	(0.0321) **
HISPANIC	0.2120	0.2687	0.3286	0.0667	0.1033	0.1731
	(0.0546) **	(0.0399) **	(0.0469) **	(0.0897)	(0.0833)	(0.0438) **
OTHER RACE	-0.1717	-0.0357	0.1412	-0.0160	-0.3461	-0.0028
	(0.0790) *	(0.0639)	(0.0624) *	(0.1394)	(0.1116) **	(0.0710)
NON-HSGRAD	-0.2902	-0.2509	0.2255	-0.1485	-0.1987	-0.3272
	(0.1280) *	(0.0832) **	(0.1040) *	(0.1497)	(0.1813)	(0.1080) **
GED	-0.2738	-0.0490	-0.0035	-0.1927	-0.1912	-0.1949
	(0.1029) **	(0.0635)	(0.0790)	(0.1237)	(0.1446)	(0.0757) *
CHILD	0.0074	-0.0236	-0.1081	-0.1906	-0.1088	0.0885
	(0.0560)	(0.0449)	(0.0523) *	(0.0837) *	(0.0799)	(0.0528)
CURRENT AGE	-0.0279	-0.0302	-0.0101	-0.0602	-0.0432	-0.0642
	(0.0059) **	(0.00549) **	(0.0061)	(0.00986) **	(0.00928) **	(0.0065) **
AFQT 1	0.0290	-0.1146	-1.0373	-0.3962	-0.5674	-0.4063
	(0.1031)	(0.0926)	(0.1039) **	(0.2052)	(0.3518)	(0.1451) **
AFQT 3A	-0.0305	-0.0794	0.4821	0.0423	-0.0641	-0.1524
	(0.0433)	(0.0345) *	(0.0443) **	(0.0640)	(0.0785)	(0.0427) **
AFQT 3B	0.0101	-0.0374	0.6379	0.0367	0.0709	0.0652
	(0.0436)	(0.0327)	(0.0389) **	(0.0626)	(0.0684)	(0.0353)
AFQT 4A or 5	-0.0352	0.0050	0.9554	0.1610	0.2719	0.1802
	0998	(0.0675)	(0.0606) **	(0.1131)	(0.0966) **	(0.0549) **
NORTHEAST	0.1932	0.1736	0.4139	0.0754	0.0741	0.3432
	(0.1077)	(0.0788) *	(0.0810) **	(0.1243)	(0.1301)	(0.0797) **
MID-ATLANTIC	0.1084	0.0878	0.2180	0.1617	0.0349	0.1606
	(0.0557)	(0.0431) *	(0.0479) **	(0.0751) *	(0.0727)	(0.0431) **
SOUTH ATLANTIC	-0.0007	-0.0427	-0.0723	-0.0675	-0.0835	0.0024
	(0.0490)	(0.0390)	(0.0461)	(0.0760)	(0.0697)	(0.0390)
EAST SOUTH CENTRAL	0.1503	-0.0355	0.1033	0.0335	0.1301	0.0912
	(0.0752) *	(0.0630)	(0.0691)	(0.1242)	(0.0976)	(0.0617)
WEST NORTH CENTRAL	0.3990	0.3418	0.4137	0.3105	0.5338	0.4986
	(0.0688) **	(0.0512) **	(0.0618) **	(0.0931) **	(0.1004) **	(0.0561) **
WEST SOUTH CENTRAL	0.1471	0.1908	0.1380	0.1080	0.1520	0.2492
	(0.0521) **	(0.0400) **	(0.0481) **	(0.0832)	(0.0749) *	(0.0425) **
MOUNTAIN	-0.0596	-0.0984	-0.0798	-0.0741	-0.1420	-0.1277
	(0.0981)	(0.0662)	(0.0785)	(0.1204)	(0.1480)	(0.0843)
PACIFIC	-0.4652	-0.4562	-0.2555	-0.5927	-0.4335	-0.5656
	(0.0886) **	(0.0600) **	(0.0655) **	(0.1179) **	(0.1271) **	(0.0832) **
Log likelihood ratio	26,316.51	44,932.78	35,672.02	12,883.94	13,797.15	36,751.05
Chi-Square	906.82 **	1,346.41	1,611.62 **	428.06 **	466.38 **	1,378.71 **
Observations	37,421	66,663	65,771	20,258	20,042	38,471

Table A-2.   Partial Effects for Pooled Model and all Individual Rating Group Models

	Pooled Ratings	Seaman	Elect Eq Repair	Comms/ Intel	Medical
CONSTANT	0.0780	0.5506	0.0056	0.0211	0.0137
RESPAY	0.00002 **	-0.0001	0.00001 **	0.00004 **	0.00003 **
UNEMPLOY RATE	0.0077 **	0.0115 **	0.0003	0.0010 **	0.0011 **
FEMALE	0.0056 **	-0.0029	-0.0003	-0.0017 *	-0.0006
MARRIED	-0.0246 **	-0.1057 **	-0.0025 **	-0.0074 **	-0.0048 **
BLACK	0.0126 **	-0.0090	0.0002	0.0033 **	-0.0010
HISPANIC	0.0149 **	0.0112	0.0008	0.0051 **	-0.0003
OTHER RACE	-0.0056 **	-0.0431	-0.0006	0.0013	-0.0043 **
NON-HSGRAD	-0.0056 *	-0.0125	0.0063 **	-0.0018	0.0018
GED	-0.0071 **	-0.0313	-0.0005	-0.0014	0.0002
CHILD	-0.0034 *	0.0151	-0.0018 **	-0.0019	-0.0003
CURRENT AGE	-0.0023 **	-0.0191 **	0.0001	-0.0005 **	-0.0004 **
AFQT 1	-0.0236 **	-0.0246	-0.0015 **	-0.0032 *	-0.0018
AFQT 3A	0.0046 **	-0.0169	0.0038 **	0.0026 **	0.0015 *
AFQT 3B	0.0146 **	0.0399 **	0.0084 **	0.0072 **	0.0032 **
AFQT 4A or 5	0.0290 **	0.0763 **	0.0095 **	0.0116 **	0.0082 **
SEAMANSHIP	0.0315 **	-	-	-	-
ELECTRONIC REPAIR	-0.0443 **	-	-	-	-
COMMS / INTEL	-0.0095 **	-	-	-	-
MEDICAL	0.0224 **	-	-	-	-
ADMIN / CLERICAL	0.0044 **	-	-	-	-
MECH REP - SURF	-0.0216 **	-	-	-	-
CRAFTSMAN / TECH	-0.0039 *	-	-	-	-
SERVICE / SUPPLY	-0.0026	-	-	-	-
NON-RATES	0.0521 **	-	-	-	-
SEP_FY_90	0.0565 **	0.1517 **	0.0068 **	0.0083 **	0.0110 **
SEP_FY_91	0.0298 **	0.1032 **	0.0039 **	0.0010	0.0056 **
SEP_FY_93	-0.0219 **	-0.1019 **	-0.0011 *	-0.0093 **	-0.0058 **
SEP_FY_94	-0.0075 **	-0.0280	-0.0004	-0.0082 **	0.0031 *
SEP_FY_95	0.0189 **	0.0644 **	0.0008	-0.0022	0.0070 **
SEP_FY_96	0.0315 **	0.0721 **	0.0016	0.0000	0.0053 **
SEP_FY_97	0.0512 **	0.1342 **	0.0008	0.0030	0.0094 **
SEP_FY_98	0.0449 **	0.1158 **	0.0033 **	0.0002	-0.0045 **
SEP_FY_99	0.0474 **	0.1244 **	0.0006	0.0067 **	-0.0081 **
SEP_FY_00	0.0495 **	0.0403	-0.0003	0.0039	0.0106 **
SEP_FY_01	0.0152 **	0.0035	-0.0010	-0.0039 *	0.0000
SEP_FY_02	-0.0086 **	-0.0387	-0.0010	-0.0103 **	-0.0046 **
New England	0.0169 **	0.0141	0.0007	0.0040 *	0.0010
Middle Atlantic	0.0095 **	0.0325 *	-0.0003	0.0018	0.0012
South Atlantic	-0.0037 **	-0.0326 *	-0.0005	-0.0022 **	-0.0001
East South Central	0.0042 *	0.0270	-0.0005	-0.0010	0.0022
West North Central	0.0346 **	0.0997 **	0.0034 **	0.0081 **	0.0070 **
West South Central	0.0144 **	0.0702 **	0.0011	0.0034 **	0.0040 **
Mountain	-0.0054 **	-0.0254	-0.0004	-0.0033 *	0.0017
Pacific	-0.0244 **	-0.1695 **	-0.0002	-0.0080 **	-0.0022 *

Group	Admin/ Clerical	Mech Eq Rep -Av	Mech Eq Rep-Surf	Craftsman/ Technical	Service/ Supply	Non- Rates
CONSTANT	0.2172	0.3543	0.0045	0.1661	0.1639	0.1239
RESPAY	-0.0001 *	-0.0004 **	0.00001 **	0.00004	-0.0001	0.0001
UNEMPLOY RATE	0.0107 **	0.0311 **	0.0006 **	0.0152 **	0.0208 **	0.0180 **
FEMALE	0.0652 **	0.0314 **	0.0013 **	0.0015	0.0115	-0.0061
MARRIED	-0.0680 **	-0.0779 **	-0.0013 **	-0.0445 **	-0.0456 **	-0.0363 **
BLACK	0.0194 **	0.0414 **	0.0015 **	-0.0125	0.0251 **	0.0416 **
HISPANIC	0.0382 **	0.0636 **	0.0017 **	0.0094	0.0147	0.0201 **
OTHER RACE	-0.0278 *	-0.0081	0.0007 *	-0.0022	-0.0421 **	-0.0003
NON-HSGRAD	-0.0453 *	-0.0551 **	0.0011 *	-0.0196	-0.0254	-0.0314 **
GED	-0.0430 **	-0.0111	-0.00002	-0.0250	-0.0246	-0.0197 **
CHILD	0.0013	-0.0054	-0.0005 *	-0.0248 *	-0.0144	0.0099
CURRENT AGE	-0.0047 **	-0.0069 **	-0.00004	-0.0082 **	-0.0058 **	-0.0068 **
AFQT 1	0.0050	-0.0258	-0.0029 **	-0.0479	-0.0639	-0.0378 **
AFQT 3A	-0.0051	-0.0179 *	0.0028 **	0.0059	-0.0086	-0.0156 **
AFQT 3B	0.0017	-0.0085	0.0040 **	0.0051	0.0099	0.0073
AFQT 4A or 5	-0.0059	0.0011	0.0071 **	0.0235	0.0407 **	0.0209 **
SEAMANSHIP	-	-	-	-	-	-
ELECTRONIC REPAIR	-	-	-	-	-	-
COMMS / INTEL	-	-	-	-	-	-
MEDICAL	-	-	-	-	-	-
ADMIN / CLERICAL	-	-	-	-	-	-
MECH REP - SURF	-	-	-	-	-	-
CRAFTSMAN / TECH	-	-	-	-	-	-
SERVICE / SUPPLY	-	-	-	-	-	-
NON-RATES	-	-	-	-	-	-
SEP_FY_90	0.0987 **	0.1691 **	0.0042 **	0.0553 **	0.0677 **	0.1343 **
SEP_FY_91	0.0848 **	0.1145 **	0.0014 **	0.0554 **	0.0855 **	0.0541 **
SEP_FY_93	-0.0653 **	-0.0867 **	0.0000	-0.0726 **	-0.0530 **	-0.0237 **
SEP_FY_94	-0.0620 **	-0.0480 **	0.0012 **	-0.0561 **	-0.0192	0.0037
SEP_FY_95	0.0365 *	0.0350 *	0.0045 **	0.0093	0.0153	0.0228 **
SEP_FY_96	0.0789 **	0.1433 **	0.0079 **	0.0044	0.0957 **	0.0054
SEP_FY_97	0.1261 **	0.1768 **	0.0104 **	0.0314	0.1203 **	0.0467 **
SEP_FY_98	0.0779 **	0.1857 **	0.0100 **	0.0563 *	0.1210 **	0.0608 **
SEP_FY_99	0.1381 **	0.1889 **	0.0092 **	0.0948 **	0.1068 **	0.0190
SEP_FY_00	0.0883 **	0.1534 **	0.0107 **	0.0827 **	0.1040 **	0.0122
SEP_FY_01	0.0052	0.1168 **	0.0042 **	0.0018	0.0690 **	-0.0047
SEP_FY_02	-0.0234	0.0387 *	0.0024 **	-0.0585 **	0.0047	-0.0545 **
New England	0.0346	0.0406 *	0.0023 **	0.0107	0.0104	0.0423 **
Middle Atlantic	0.0190	0.0203 *	0.0011 **	0.0236 *	0.0048	0.0185 **
South Atlantic	-0.0001	-0.0097	-0.0003	-0.0091	-0.0111	0.0003
East South Central	0.0266 *	-0.0081	0.0005	0.0047	0.0186	0.0102
West North Central	0.0753 **	0.0815 **	0.0023 **	0.0476 **	0.0867 **	0.0650 **
West South Central	0.0260 **	0.0448 **	0.0007 **	0.0155	0.0219 *	0.0297 **
Mountain	-0.0100	-0.0222	-0.0003	-0.0100	-0.0185	-0.0132
Pacific	-0.0688 **	-0.0963 **	-0.0010 **	-0.0669 **	-0.0512 **	-0.0496 **

APPENDIX B.   MAXIMUM LIKELIHOOD LOGIT COEFFICIENTS FOR YEARS 1992 - 1994, AND FOR ALL OTHER YEARS IN THE SAMPLE

Table B-1.   Maximum Likelihood Logit Coefficient Estimates for 1992-1994 Sample, 1990-1991 and 1995-2002 Sample and Pooled Sample

Group	1992-1994 Sample	1990-1991 and 1995-2002 Sample	Pooled Sample
INTERCEPT	-2.0254	-0.8550	-1.0893
	(0.2092) **	(0.1080) **	(0.0961) **
RESPAY	-0.0004	-0.0007	-0.0003
	(0.00017) *	(0.00008) **	(0.00007) **
UNEMPLOY RATE	0.0847	0.0857	0.0012
	(0.0085) **	(0.0049) **	(0.0039)
FEMALE	0.1025	0.0487	0.0605
	(0.0314) **	(0.0179) **	(0.0155) **
MARRIED	-0.3924	-0.3889	-0.3770
	(0.0282) **	(0.0157) **	(0.0137) **
BLACK	0.1920	0.1268	0.1537
	(0.0258) **	(0.0166) **	(0.0139) **
HISPANIC	0.0582	0.2126	0.2140
	(0.0360)	(0.0200) **	(0.0174) **
OTHER RACE	-0.4663	-0.0300	-0.0955
	(0.0671) **	(0.0295)	(0.0268) **
NON-HSGRAD	-0.0228	-0.0650	-0.0855
	(0.0614)	(0.0450)	(0.0361) *
GED	-0.1003	-0.1380	-0.1309
	(0.0574)	(0.0341) **	(0.0292) **
CHILD	0.0027	-0.0470	-0.0522
	(0.0364)	(0.0224) *	(0.0190) **
CURRENT AGE	-0.0274	-0.0307	-0.0290
	(0.0044) **	(0.0025) **	(0.0022) **
AFQT 1	-0.3624	-0.4096	-0.4050
	(0.0773) **	(0.0405) **	(0.0358) **
AFQT 3A	0.1291	-0.0128	0.0097
	(0.0295) **	(0.0166)	(0.0143)
AFQT 3B	0.2426	0.1176	0.1347
	(0.0296) **	(0.0154) **	(0.0133) **
AFQT 4A or 5	0.4109	0.3536	0.3057
	(0.0392) **	(0.0309) **	(0.0236) **

Group	1992-1994 Sample	1990-1991 and 1995-2002 Sample	Pooled Sample
SEAMANSHIP	0.4034	0.4118	0.4019
	(0.0441) **	(0.0248) **	(0.0215) **
ELECTRONIC EQUIP	-0.7186	-0.9427	-0.9004
	(0.0682) **	(0.0350) **	(0.0311) **
COMMS / INTEL	-0.0134	-0.1446	-0.1334
	(0.0389)	(0.0220) **	(0.0191) **
MEDICAL	0.3992	0.2093	0.2505
	(0.0454) **	(0.0268) **	(0.0230) **
ADMIN / CLERICAL	-0.0109	0.1072	0.0724
	(0.0444)	(0.0234) **	(0.0206) **
EQUIP REP SURFACE	-0.3191	-0.3219	-0.3303
	(0.0399) **	(0.0218) **	(0.0190) **
CRAFTSMAN / TECH	0.0058	-0.0502	-0.0642
	(0.0523)	(0.0310)	(0.0266)
SERVICE / SUPPLY	-0.0157	-0.0272	-0.0382
	(0.0499)	(0.0304)	(0.0258)
NON-RATES	0.6968	0.4203	0.5060
	(0.0379) **	(0.0239) **	(0.0200) **
NORTHEAST	0.4104	0.1221	0.2010
	(0.0624) **	(0.0366) **	(0.0315) **
MID-ATLANTIC	0.1769	0.0913	0.1517
	(0.0337) **	(0.0203) **	(0.0173) **
SOUTH ATLANTIC	-0.0080	-0.1009	-0.0984
	(0.0303)	(0.0186) **	(0.0158) **
EAST SOUTH CENTRAL	0.2348	-0.0435	0.0477
	(0.0455) **	(0.0295)	(0.0247)
WEST NORTH CENTRAL	0.4975	0.3119	0.2505
	(0.0422) **	(0.0251) **	(0.0213) **
WEST SOUTH CENTRAL	0.3348	0.0995	0.1869
	(0.0317) **	(0.0197) **	(0.0167) **
MOUNTAIN	-0.1521	-0.1279	-0.1334
	(0.0655) *	(0.0332) **	(0.0294) **
PACIFIC	-1.2975	-0.3952	-0.4147
	(0.0941) **	(0.0281) **	(0.0263) **
Log likelihood ratio	71,295.16	188,520.15	262,006.49
Chi-Square	3,519.80 **	7,077.42 **	9,137.25 **
Observations	121,554	264,565	386,119

APPENDIX C.   MAXIMUM LIKELIHOOD LOGIT COEFFICIENTS FOR 'DOT-COM' BOOM YEARS 1997 - 1999 AND FOR 'DOT-COM' BUST YEARS 2000 - 2002

Table C-1.   Maximum Likelihood Logit Coefficient Estimates for 'Dot-Com' Boom and Bust Years

Group	Boom Years 1997-1999	Bust Years 2000-2002	Pooled Years 1997-2002
INTERCEPT	-4.6315	-2.0682	-1.3922
	(0.2527) **	(0.2404) **	(0.1432) **
RESPAY	0.0020	0.0000	-0.0008
	(0.0002) **	(0.00019)	(0.0001) **
UNEMPLOY RATE	0.2102	-0.0902	0.0946
	(0.0116) **	(0.0166) **	(0.0093) **
FEMALE	0.2334	0.2442	0.1706
	(0.0330) **	(0.0366) **	(0.0238) **
MARRIED	-0.3294	-0.3134	-0.2865
	(0.0296) **	(0.0341) **	(0.0222) **
BLACK	0.2575	0.1392	0.1593
	(0.0319) **	(0.0384) **	(0.0242) **
HISPANIC	0.3580	0.2974	0.3436
	(0.0362) **	(0.0416) **	(0.0268) **
OTHER RACE	0.1837	0.0856	0.1239
	(0.0527) **	(0.0511)	(0.0363) **
NON-HSGRAD	-0.0662	0.1946	-0.0030
	(0.1179)	(0.1120)	(0.0810)
GED	-0.0213	-0.0376	-0.1129 *
	(0.0636)	(0.0617)	(0.0440)
CHILD	-0.0051	-0.1504	0.0514
	(0.0392)	(0.0816)	(0.0337)
CURRENT AGE	-0.0151	0.0120	0.0004
	(0.0049) **	(0.0051) *	(0.0035)
AFQT 1	-0.7293	-0.3555	-0.5633
	(0.0824) **	(0.1996) **	(0.0631) **
AFQT 3A	-0.0286	-0.1676	-0.1019
	(0.0321)	(0.0395) **	(0.0242) **
AFQT 3B	0.1547	-0.1408	0.0057
	(0.0298) **	(0.0366) **	(0.0221)
AFQT 4A or 5	0.8587	-1.0687	0.5989
	(0.1801) **	(0.7228)	(0.1674) **

Table C-1. (continued)

Group	Boom Years 1997-1999	Bust Years 2000-2002	Pooled Years 1997-2002
SEAMANSHIP	0.3556	0.2464	0.3730
	(0.0475) **	(0.0623) **	(0.0373) **
ELECTRONIC EQUIP	-1.2673	-1.0764	-1.1690
	(0.0798) **	(0.0654) **	(0.0501) **
COMMS / INTEL	-0.3343	-0.0690	-0.1605
	(0.0425) **	(0.0454)	(0.0308) **
MEDICAL	-0.2594	0.3538	0.0358
	(0.0599) **	(0.0532) **	(0.0391)
ADMIN / CLERICAL	0.0528	0.0230	0.0835
	(0.0426)	(0.0542)	(0.0331) *
EQUIP REP SURFACI	-0.2585	-0.0458	-0.1390
	(0.0411) **	(0.0450)	(0.0302) **
CRAFTSMAN / TECH	-0.1582	-0.0035	-0.0816
	(0.0636)	(0.0676)	(0.0461)
SERVICE / SUPPLY	-0.0597	0.0579	-0.0149
	(0.0580)	(0.0713)	(0.0447)
NON-RATES	0.3960	0.2675	0.3123
	(0.0433) **	(0.0879) **	(0.0354) **
NORTHEAST	-0.0023	-0.3449	-0.1638
	(0.0743)	(0.0944) **	(0.0576) **
MID-ATLANTIC	-0.2126	-0.0888	-0.1982
	(0.0415) **	(0.0544)	(0.0319) **
SOUTH ATLANTIC	-0.0978	-0.2546	-0.1998
	(0.0335) **	(0.0506) **	(0.0273) **
EAST SOUTH CENTR	-0.1292	-0.1047	-0.2053
	(0.0601) *	(0.0700)	(0.0445) **
WEST NORTH CENTI	0.3344	-0.0046	0.1271
	(0.0500) **	(0.0659)	(0.0390) **
WEST SOUTH CENTI	-0.0387	0.0275	-0.0724
	(0.0358)	(0.0514)	(0.0286) *
MOUNTAIN	-0.2064	-0.0688	-0.1988
	(0.0695) **	(0.0622)	(0.0436) **
PACIFIC	-0.1895	-0.0387	-0.3516
	(0.0634) **	(0.0519)	(0.0344) **
Log likelihood ratio	51,376.56	39,112.59	91,425.00
Chi-Square	2,048.37 **	938.99 **	2,787.64 **
Observations	67,848	67,377	135,225

BIBLIOGRAPHY

Asch, Beth, "A Technique for Estimating the Effect of Pay on Selected Reserve Supply," Center for Naval Analysis Research Memorandum 86-42, March 1986.

Asch, Beth, "Data and Preliminary Empirical Results for SELRES Affiliation Analyses," Center for Naval Analysis Research Memorandum 86-43, March 1986.

Asch, Beth, James Hosek, and John Warner, "An Analysis of Pay and Personnel", RAND Corporation Documented Briefing DB-344-OSD, August 2001.

Buddin, Richard and Sheila Kirby, "Enlisted Personnel Trends in the Selected Reserve, 1986-1994," RAND Corporation Research Memorandum MR-681/2-OSD, December 1996.

Bureau of Labor Statistics, http://data.bls.gov. Accessed January 2005.

Commander Naval Reserve Forces, VADM John Cotton, as cited by Navy News Update, 21 September, 2004.

COMNAVRESFORINST 1001.5(series), Administrative Procedures for the Drilling Reserve and Participating Members of the Individual Ready Reserve (IRR).

COMNAVRESFORCOM Letters SER N16(series).

Defense Finance and Accounting Service (DFAS), Prior Year Military Pay Rates, http://www.dfas.mil/money/milpay/priorpay. Accessed January 2005.

Economic Report of the President (2003), Downloadable Reports, http://a257.g.akamaitech.net/7/257/2422/17feb20051700/www.gpoaccess.gov/usbudget/fy04/sheets/b60.xls. Accessed January 2005.

Ehrenberg, R.G. and R.S. Smith (2003), Modern Labor Economics: Theory and Public Policy, 8th ed. Boston: Addison-Wesley.

Grissmer, David, Sheila Kirby, Richard Buddin, Jennifer Kawata, Jerry Sollinger, and Stephanie Williamson, "Prior Service Personnel: A Potential Constraint on Increasing Reliance on Reserve Forces," RAND Corporation Research Memorandum MR-362-OSD, December 1994.

Hosek, James and Jennifer Sharp, "Keeping Military Pay Competitive: The Outlook for Civilian Wage Growth and Its Consequences," RAND Corporation Issue Paper, April 2001.

Kirby, Sheila Nataraj, David W. Grissmer, Stephanie Williamson, and Scott Naftel, "Costs and Benefits of Reserve Participation: New Evidence from the 1992 Reserve Component Survey," RAND, Research Memorandum MR-812-OSD, 1997.

Kirby, Sheila Nataraj and Scott Naftel, "The Effect of Mobilization on Retention of Enlisted Reservists after Operation Desert Storm/Shield," RAND, Research Memorandum MR-943-OSD, 1998.

Kostiuk, Peter F. and James E. Grogan, "Enlistment Supply into the Naval Reserve," Center for Naval Analyses, Research Memorandum 87-239, December 1987.

Mehay, Stephen, "Reserve Participation Versus Moonlighting: Are They the Same?," <u>Defence Economics</u>, 1991, Vol. 2, pp. 325-337.

NAVPERS 18068F, Navy Enlisted Manpower and Personnel Classification Manual, Appendix B.

Shiells, Martha, "Affiliation of Navy Veterans with the Selected Reserve," Center for Naval Analyses, Research Memorandum 86-249, December 1986.

U.S. Census Bureau, http://www.census.gov/geo/www/us_regdiv.pdf. Accessed February 2005.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, Virginia

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, California

3. Office of the Chief of Naval Operations
   N1 Strategic Planning and Analysis Directorate
   Washington, D.C.

4. Office of the Chief of Naval Reserve
   Head, Personnel Policy Branch
   Washington, D.C.

5. Commander Naval Reserve Forces Command (N1)
   New Orleans, Louisiana

6. Professor Stephen Mehay
   Naval Postgraduate School
   Monterey, California

7. Commander Suzanne Bosque
   Naval Postgraduate School
   Monterey, California